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VOL. I, pp. 1-6. December 20, 1907.

Expedition of the California Academy of Sciences to the Galapagos Islands, 1905-1906.

I.

Preliminary Descriptions of Four New Races of Gigantic Land Tortoises from the Galapagos Islands.

BY

JOHN VAN DENBURGH,

Curator of the Department of Herpetology.

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PRELIMINARY DESCRIPTIONS OF FOUR NEW RACES OF GIGANTIC LAND TORTOISES FROM THE GALAPAGOS ISLANDS.

BY JOHN VAN DENBURGH,

Curator of the Department of Herpetology.

Early in 1905 the California Academy of Sciences decided to send an expedition to the Galapagos Islands. The general purpose was to explore this group more thoroughly than the opportunities of previous investigators had permitted, and to secure large collections of the plants, mollusks, insects, birds, mammals, and reptiles in the hope of throwing more definite light upon the origin of the archipelago. Particularly, it was determined to study the geology of the islands, to make a very careful search for fossils, and to spare no effort to secure specimens or remains of those races of the gigantic land tortoises which long had been thought extinct.

Study of the published results of previous expeditions had convinced me not only that these islands must all, at some

December 19, 1907.

former period, have been parts of a single land-mass, becoming later, by partial submersion, separated into the various islands, but that Albemarle Island, which possesses several races of tortoises and on which Heller and Snodgrass found evidence of an elevation amounting to several hundred feet, had much more recently been formed by the union of several smaller islands corresponding, probably, to its five great volcanoes. Accordingly, the members of the expedition were instructed to collect on Albemarle exactly as though it still were five islands.

The expedition set sail from San Francisco, on the twenty-eighth of June, 1905, in the schooner "Academy," which had been purchased and rechristened for the purpose. The scientific staff of the expedition consisted of eight young men. Mr. R. H. Beck, who has had more experience in these islands than any other collector, this being his fourth expedition to them, was in charge. Mr. Alban Stewart went as botanist; Mr. W. H. Ochsner, as geologist; Mr. F. X. Williams, as entomologist; while Mr. E. W. Gifford and Mr. J. S. Hunter were to study and collect the birds, and my assistant Mr. J. R. Slevin, with the aid of Mr. E. S. King, was to care for the reptiles.

Having made brief stops at various islands near the coast of Lower California, as well as at San Benedicto, Socorro, Clipperton, and Cocos Islands, the party reached the Galapagos Archipelago and landed upon Hood Island, September 24, 1905. During the months which followed the most arduous collecting was vigorously carried on in all the islands of the group, many of the larger being visited several times, and on September 25, 1906, after a full year of work, the "Academy" left Culpepper Island and set sail for San Francisco, where she arrived in safety Thanksgiving Day, November 29, 1906.

The collections brought back are by far the largest and most important ever gathered in these islands. The reptiles number over forty-five hundred specimens, of which nearly four thousand are from the Galapagos. The search for land tortoises met with far greater success than I had dared anticipate. All of the races which had been supposed extinct were found still living, with the exception of that of Charles Island. Tortoises were also found living on two islands which they had not previously been known to inhabit. On Barrington Island, also not hitherto known to have supported tortoises, portions of the remains of fourteen individuals were secured. It is probable that the tortoise of this island, like that of Charles, is really extinct. A single tortoise was secured on Cowley Mountain, Albemarle Island, and others were found living in all of the other localities from which these huge reptiles have ever been recorded. In all over three hundred tortoises are represented in the collection, some forty of them, however, only by more or less fragmentary remains.

A complete report upon this collection can only be issued after an immense amount of work. Meanwhile, it seems best to publish this brief statement and the following preliminary descriptions of the tortoises of Hood, James, Chatham, and Narborough Islands, which seem never to have been described.

Testudo hoodensis new species.

Type.—Adult (?) female (?) now living in Golden Gate Park, San Francisco. California Academy of Sciences No. 8121. Hood Island, Galapagos Archipelago. Joseph R. Slevin and E. S. King. Caught June 27, 1906.

Diagnosis.—No nuchal; gulars paired; front of carapace high, little lower than middle, height at nuchal notch more than 41% (45%) of straight length; difference between percentages of heights at third vertebral and at nuchal notch less than 9 (5); carapace saddle-shaped, narrow anteriorly, width at margin of junction of second and third marginals not more than 54% (45%); first marginals not greatly enlarged, not much everted, their ventral surfaces not vertical, their most prominent points separated by less than 30% (20%); length over curve not more than 123% (122%), greater than width over curve; vertical distance from lower surface of plastron to lower edge of lateral marginals great, 12%; general size rather small, straight length (June, 1907) 22.2 inches; plastron long, median length 89%; plates striated, central portions of vertebrals and costals much elevated; pectoral plates forming a suture on median line; lower jaw and throat marked with yellow.

Testudo darwini new species.

Type.—Adult male. California Academy of Sciences No. 8108. James Island, Galapagos Archipelago. R. H. Beck and Joseph R. Slevin. July 31, 1906.

Diagnosis.—No nuchal; gulars paired; fourth cervical vertebra biconvex;[1] carapace high, elongate, somewhat dome-shaped but high in front; posterior declivity beginning about middle of third vertebral; height at nuchal notch more than 41% (45%) of straight length; difference between percentages of height at third vertebral and at nuchal notch more than 9 (10); carapace not saddle-shaped, width at margin of junction of second and third marginals 55%; width over curve in male not greater than length over curve; vertical distance from lower surface of plastron to lower edge of lateral marginals moderately great (9%); general size large, straight length 38 inches; shell heavy; pectoral plates forming a suture on median line; the sum of the measurements of the length over curve, length of plastron, height at nuchal notch, and height at third vertebral, equals or exceeds the sum of the measurements of the straight length, straight width, and width over curve; jaws and throat black.

Testudo chathamensis new species.

Type.—Skeleton of adult male. California Academy of Sciences No. 8127. Found in a cave on Chatham Island, Galapagos Archipelago. R. H. Beck and Joseph R. Slevin. February 12–14, 1906.

Diagnosis.—No nuchal; gulars paired; fourth cervical vertebra biconvex; carapace depressed, front elevated in male; height at nuchal notch less than 41% of straight length (male 34, female 27%); male flat-backed, female dome-shaped, difference between percentages of heights at third vertebral and at nuchal notch 6 in male, 24 in female; carapace of male slightly saddle-shaped but broad, width at margin of junction of second and third marginals 53% in male; anterior marginals but little everted; length over curve in male 112%, female 126%; vertical distance from lower surface of plastron to lower edge of lateral marginals small, 4% in male, 6% in female; general size moderate, straight length in male 35.25 inches, female 22.5 inches; pectoral plates much reduced, not meeting on mid-line; jaws and throat of female black.

Testudo phantasticus new species.

Type.—Adult male. California Academy of Sciences No. 8101. Narborough Island, Galapagos Archipelago. R. H. Beck. April 5, 1906.

[1]It is probable that this is the normal arrangement in all the races of the Galapagos Islands. The third cervical vertebra has been found biconvex in the types of *T. galapagoensis* and *T. becki;* but in seven specimens of the latter the fourth is biconvex, as in other races.

Diagnosis.—No nuchal; gulars paired; fourth cervical vertebra biconvex; front of carapace high, not lower than middle, height at nuchal notch more than 41% (54%) of straight length; difference between percentages of height at third vertebral and at nuchal notch less than 9 (2); carapace saddle-shaped, narrow anteriorly, width at margin of junction of second and third marginals not more than 54% (46%); first marginals much enlarged, everted more than in any other race, their ventral surfaces nearly vertical, their edges from nuchal notch to prominent point nearly horizontal, prominent point almost a right angle; distance between prominent points of first marginals more than 30% (32%); length over curve more than 123% (124%), greater than width over curve; vertical distance from lower surface of plastron to lower edge of lateral marginals small, 6%; general size moderate, straight length 34.5 inches; plastron short, 70%; pectoral plates forming a suture on median line; lower jaw and throat marked with yellow.

A few words in explanation of the measurements given in the foregoing descriptions may be necessary. In attempting to avoid the indefiniteness which has too largely characterized descriptions of these tortoises it was quickly found necessary to devise some means of expressing and comparing upon paper their individual variation in shape. This, it was found, could best be done by taking numerous measurements of each tortoise and reducing all these measurements to percentages of the (straight) length of the tortoise. In this way, the measurements of tortoises of all sizes may be directly compared. The tortoise is placed upon a level board or table in such a position that it rests naturally upon, as nearly as possible, the entire length of the plastral bridge of each side. With the tortoise in this position, the straight length is the distance between verticals erected at the nuchal notch and at the posterior border of the supracaudal plate. The straight width is the distance between verticals erected at the sides of the tortoise opposite the line of meeting of the second and third costal plates. The curved length is measured with a tape-measure over the midvertebral line from the nuchal notch to the posterior edge of the supracaudal plate. The curved width is taken from the bend in the marginal plates up along the line of meeting of the second and third costals, across the middle of the third vertebral, down between the second and third costals, to the line of bending of the marginals. The width second to third marginals is the straight width at the level of the lateral margins of the sutures between the second and third marginal plates of each side. The middle height is the vertical distance between the board or table and the middle of the third vertebral plate, and is taken with a square and spirit-level. The front height is taken in the same manner at the nuchal notch. The height to marginals is the vertical distance from the table to the lower border of the marginal plates at about the middle of the plastral bridge. The plastron is measured with a tape along the median line, the tape is not pushed into plastral depressions and when the plastron is notched the projections are not measured.

SAN FRANCISCO,
November 18, 1907.

The Academy cannot supply the back numbers of its publications, its entire reserved stock having been destroyed in the conflagration of April, 1906.

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VOL. I, pp. 7-288 JANUARY 20, 1911

Expedition of the California Academy of Sciences to the Galapagos Islands, 1905-1906

II

A Botanical Survey of the Galapagos Islands

BY

ALBAN STEWART

Botanist to the Expedition

SAN FRANCISCO
PUBLISHED BY THE ACADEMY
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BY ALBAN STEWART

Botanist to the Expedition

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PLATES I-XIX

January 14, 1911

INTRODUCTION

In the spring of 1905 I received the appointment of botanist of the scientific expedition sent to the Galapagos Islands by the California Academy of Sciences. In preparing for this expedition the California Academy purchased the U. S. Ship "Ernest," a two masted schooner of eighty-seven tons burden, and after refitting, rechristened her the "Academy." Our party consisted of eleven members, as follows: R. H. Beck, chief; F. X. Williams, entomologist; W. H. Ochsner, geologist and conchologist; J. R. Slevin, herpetologist; J. S. Hunter and E. W. Gifford, ornithologists; E. S. King, assistant herpetologist; Frederick T. Nelson, mate; J. J. Parker, navigator; James W. White, cook; and myself, botanist. All of the scientific members of the expedition shipped as seamen, so that the expedition was made up mostly of sailor-scientists.

The expedition left San Francisco on the morning of June 28, 1905, and arrived at Hood Island, the most southern member of the Galapagos group, on September 24, nearly three months having been consumed on the trip, during which short stops were made at Ensenada, Lower California, and on San Martin, San Benito, San Geronimo, Cerros, Natividad, San Benedicto, Socorro, and Clipperton islands, Mexico, and Cocos Island, Costa Rica, on the most of which small collections of plants were made. The expedition left the Galapagos Islands on the 25th of the following September, so that a year and one day was spent in the archipelago, during which time all of the islands were visited at least once, and the larger and more important ones two or more times at different seasons of the year.

Up to the present time our knowledge of the flora of the Galapagos Islands has been due mainly to the collections of Darwin, Andersson, Baur, and Snodgrass and Heller, and to the writings of Hooker, Andersson, and Robinson.[1]

[1] For a table of the botanical collections made on the Galapagos Islands, see Robinson, Flora of the Galapagos Islands, Proceedings of the American Academy of Arts and Sciences, v. 38, no. 4, pp. 221-223.

Unfortunately many of the former collectors of plants remained but a short time upon the islands, and as most of them were not botanists, our knowledge of the general botanical conditions has remained rather meager.

It was the intention at first to incorporate the entire botanical results of the expedition in a single paper, but as the present paper has assumed greater proportions than was expected, it seems best to divide the subject and publish the parts separately. The present paper consists of a rather detailed account of the different species of vascular plants, including their range in elevation and their distribution on the different islands; a brief description of the different botanical regions; an account of the general features of the flora; an account of the factors governing the growth of vegetation; and an account, so far as possible, of the evidence offered by the collection concerning the origin of the islands and of the flora. A second paper will deal entirely with a description of the botanical conditions on each island of the group, and short papers will treat of the lichens and mosses.

The plan of treatment of the first part of this paper is in general the same as that pursued by Robinson in his "Flora of the Galapagos Islands," as I was unable to devise a plan which I thought would be better. Many of the statistical tables are simply revisions of the tables as given by Dr. Robinson, although a few new ones have been added where it seemed necessary. The entire nomenclature has been carefully gone over and revised to make it conform with the new rules of the Vienna conference. The ferns have been treated as a single family and not split up into several different families as has been done by some authors. Treating the group in this manner has enabled me to handle it to better advantage in the latter part of this paper. With but one exception the nomenclature of Christensen, "Index Filicum," has been used in this family. Unfortunately none of our instruments of measurement were graduated with the metric system, otherwise it would have been used. In order to economize space, the names of former collectors are only mentioned where there are neither specimens or notes of a species from a given locality in the collection under consideration.

The collections of vascular plants were identified by myself at the Gray Herbarium of Harvard University under the direction of Dr. B. L. Robinson, Curator of the Gray Herbarium. I wish here to express my thanks to Dr. Robinson for his kindness in giving me free access to the excellent collections of plants from the Galapagos Islands which are in the Gray Herbarium, as well as for advice and assistance in innumerable places, rendered doubly valuable on account of his intimate knowledge of the flora of these islands. Dr. Robinson has also been kind enough to read and criticise the manuscript and to give advice about the arrangement of the same. I wish also to express my thanks to Dr. W. G. Farlow of Harvard University for identifying the lichens and mosses, and to Miss Mary A. Day, Librarian of the Gray Herbarium, for assistance in looking up the rather large amount of literature made necessary in revising the nomenclature. I wish further to acknowledge the kindness of Prof. M. L. Fernald of the Gray Herbarium for assistance in many places, of Mr. Casimir de Candolle of Geneva, Switzerland, for assistance on *Peperomia,* of Mr. A. S. Hitchcock of the U. S. Department of Agriculture for aid in regard to the Gramineae, of Mr. H. D. House for assistance in the identification of some of the members of the Convolvulaceae, of Mr. W. H. Ochsner, geologist of the expedition, and Mr. E. W. Gifford, joint ornithologist of the expedition, for information about their particular subjects, and of Mr. H. H. Bartlett of the U. S. Department of Agriculture for assistance in translating many of the descriptions of the new species, varieties, and forms into Latin.

Account of the Species of Vascular Plants

PTERIDOPHYTA

FILICES

Acrostichum L.

A. aureum L. Sp. Pl. 1069 (1753); Rob. (1), 104.—Albemarle Isl.: Villamil, occasional in protected places at 3150 ft. (nos. 773-774). Further distr. general in tropical countries.

Adiantum L.

A. aethiopicum L. Sp. Pl. ed. 2, 1560 (1763); Rob. (1), 105.—Galapagos Ids.: acc. to Moore. Further distr. general in tropical countries.

A. Alarconianum Gaud. Voy. Bon. Bot. t. 99 (1846). *A. incisum* Presl, Rel. Haenk. I. 61, t. 10, f. 3 (1830); Rob. (1), 105.—Galapagos Ids.: acc. to Moore. Further distr. Mex., S. Am.

A. concinnum H. & B. in Willd. Sp. V. 451 (1810); Rob. (1), 105.—Abingdon Isl.: common in lava cracks at 550 ft. (no. 776). Albemarle Isl.: Cowley Bay, common among shady rocks at 2000 ft. (no. 779); Iguana Cove, common on side of the cliff above the cove (no. 780); Tagus Cove, common in lava cracks at 1600 ft. (no. 778); Villamil, common in lava caverns at 1350 ft. (nos. 781-782). Charles Isl.: on moist shady rocks at 1000 ft. (nos. 783-784). James Isl.: *Darwin; Scouler.* Narborough Isl.: south side, *Snodgrass and Heller.* Further distr. Mex., W. Ind., northern S. Am.

A. diaphanum Bl. Enum. 215 (1828).—Albemarle Isl.: Villamil, occasional in moist places on the south side of the mountain at 3150 ft. (no. 785). Further distr. Old World.

A. Henslovianum Hook. f. (3), 169; Rob. (1), 105.—Abingdon Isl.: common in shady places 1500-1650 ft. (nos. 786-788). Albemarle Isl.: Tagus Cove, occasional at 400 ft., abundant at 4000 ft., (no. 790); Villamil, common in lava caverns at 1350 ft. (nos. 789, 791-793). CHARLES ISL.: *Darwin.* CHATHAM ISL.: Wreck Bay, occasional at 1700 ft. (no. 794). INDEFATIGABLE ISL.: Academy Bay, common in shady places at 550 ft. (no. 795). JAMES ISL.: James Bay, common on moist shady banks at 2150 ft. (nos. 796-797). Further distr. Andean S. Am.

A. macrophyllum Sw. Prodr. 135 (1788).—ALBEMARLE ISL.: Villamil, common in lava caverns at 1350 ft. (no. 799). INDEFATIGABLE ISL.: Academy Bay, occasional in dense shade above 500 ft. (no. 800). JAMES ISL.: James Bay, on shady banks at 2100 ft. (no. 801). Further distr. Mex., W. Ind., northern S. Am. This fern is always found in the densest shade where there is a considerable amount of moisture.

A. parvulum Hook. f. (3), 168; Rob. (1), 106.—CHARLES ISL.: *Darwin.* Endemic.

A. patens Willd. Sp. V. 439 (1810); Rob. (1), 106.—GALAPAGOS IDS.: acc. to Moore. Further distr. Mex., northern S. Am.

A. petiolatum Desv. Berl. Mag. V. 326 (1811). *A. Kaulfussii* Kunze, Linnaea, XXI. 221 (1848); Rob. (1), 105.—CHATHAM ISL.: acc. to Moore. INDEFATIGABLE ISL.: Academy Bay, common in shady places at 500 ft. (no. 798). Further distr. Mex., W. Ind., S. Am.

A. tetraphyllum H. B. Willd. Sp. V. 441 (1810). *A. prionophyllum* HBK. Nov. Gen. & Sp. I. 20 (1815); Rob. (1), 106.—CHATHAM ISL.: acc. to Moore. Further distr. Mex. W. Ind., S. Am.

Anogramma Link

A. chaerophylla (Desv.) Link, Fil. Sp. 138 (1841). *Gymnogramme chaerophylla* Desv. Berl. Mag. V. 305 (1811); Rob. (1), 109.—CHARLES ISL.: *Darwin.* Further distr. Mex., W. Ind., S. Am. Robinson, l. c., expresses doubt as to the identity of the *Darwin* specimen.

A. leptophylla (L.) Link, Fil. Sp. 137 (1841). *Polypodium leptophylla* L. Sp. Pl. 1092 (1753). *Gymnogramme lepto-*

phylla Desv. Jour. Bot. I. 26 (1813); Rob. (1), 109.—Charles Isl.: *Baur.* Widely distributed in tropical regions.

Aspidium Sw.

A. martinicense Spr. Anleit. III. 133 (1804). *Nephrodium macrophyllum* Bak. Syn. Fil. 300 (1874); Rob. (1), 110.—Albemarle Isl.: Villamil, common in protected places on the south side of the mountain at 3150 ft. (no. 902). James Isl.: James Bay, common in moist situations at 2000 ft. (no. 901). Further distr. Mex., W. Ind., northern S. Am.

Asplenium L.

A. anisophyllum Var. **latifolium**, Hook. Sp. Fil. III. 111 (1860); Rob. (1), 106.—Galapagos Ids.: *Capt. Wood.* James Isl.: *Darwin.* Further distr. Mex., W. Ind., S. Am., Old World.

A. cristatum Lam. Ency. II. 310 (1786). *A. cicutarium* Sw. Prod. 130 (1788); Rob. (1), 107.—Abingdon Isl.: common around 1950 ft. (no. 820). Albemarle Isl.: Villamil, common in lava caverns at 1350 ft. (no. 821). Chatham Isl.: Wreck Bay, occasional in protected places around 1800 ft. (no. 822). Indefatigable Isl.: Academy Bay, common in shady places above 550 ft. (no. 823). James Isl.: James Bay, rare in lava caverns at 1000 ft., common on moist shady rocks at 2150 ft., (nos. 824-827). Further distr. Mex., W. Ind., S. Am., Africa.

A. formosum Willd. Sp. V. 329 (1810); Rob. (1), 107.—Abingdon Isl.: abundant at 1400 ft. (no. 825). Albemarle Isl.: Iguana Cove, abundant in shade at 250 ft. (no. 833); Tagus Cove, common in lava crevices, 1600-2800 ft. (nos. 832, 834); Villamil, common among rocks at 1300 ft. (nos. 835-836). Charles Isl.: abundant on moist shady rocks at 1000 ft., and to some extent on the walls of the main crater at a somewhat higher elevation, (nos. 830, 844, 845). Chatham Isl.: Wreck Bay, common in moist shady places at 650 ft. (no. 837). Indefatigable Isl.: Academy Bay, in leaf mold among rocks 400-600 ft., larger and more abundant at the higher elevation, (nos. 841-842); northwest side, among rocks at 900 ft., (no. 1027); southeast side, common on shady rocks at 625 ft. (no. 843). JAMES ISL.: James Bay, abundant in lava caverns at 900 ft., and in moist shady places at 2150 ft., where it reaches a height of 18 inches, (no. 838). NARBOROUGH ISL.: in the upper moist regions (no. 840). Further distr. general in tropical regions.

A. laetum Sw. Syn. Fil. 79, 271 (1806); Rob. (1), 107.—CHATHAM ISL.: *Capt. Wood.* Further distr. Mex., W. Ind., S. Am.

A. lunulatum Sw. Syn. Fil. 80 (1806); Rob. (1), 107.—CHARLES ISL.: *Lee.* Further distr. general in tropical regions.

A. myriophyllum (Sw.) Presl, Rel. Haenk. I. 48 (1825). *Caenopteris myriophylla* Sw. Schrad. Jour. 1800, 2, 60 (1801). *Asplenium rhizophyllum* Kze. Linnaea, IX. 71 (1834); Rob. (1), 107.—GALAPAGOS IDS.: *Capt. Wood.* JAMES ISL.: *Darwin.* Further distr. general in tropical regions.

A. praemorsum Sw. Prod. 130 (1788). *A. furcatum* Thunb. Prodr. Fl. Cap. 172 (1800); Rob. (1), 107.—ALBEMARLE ISL.: Tagus Cove, in lava caverns on the west side of the mountain at 2200 ft. (no. 847); Villamil, occasional on trees in the upper moist regions, specimens taken at 1350 ft. (no. 846). INDEFATIGABLE ISL.: Academy Bay, occasional in leaf mold at 425 ft. (no. 848). NARBOROUGH ISL.: (no. 852). JAMES ISL.: James Bay, occasional on the branches of trees at 2150 ft. (nos. 850-851) Further distr. general in tropical regions.

A. pumilum Sw. Prod. 129 (1788).—CHARLES ISL.: in moist lava crevices at 1000 ft. (no. 853). INDEFATIGABLE ISL.: Academy Bay, common in leaf mold in open places in the vegetation at 425 ft. (no. 854). Further distr. Mex., W. Ind., northern S. Am.

A. rutaceum (Willd.) Metten. Asplen. 129, t. 5, f. 32-33 (1859). *Aspidium rutaceum* Willd. Sp. V. 266 (1810). *Asplenium rutaceum* Metten. l. c.: Rob. (1), 108.—GALApagos Ids.: acc. to Hook. & Bak. Syn. Fil. 220. Further distr. Mex., W. Ind., S. Am.

A. Serra Langsd. & Fisch. Fil. 16, t. 16 (1810-1818); Rob. (1), 108.—Albemarle Isl.: Villamil, common on moist rocks in protected places at 1500 ft. and in similar situations at 3150 ft. (nos. 856-857). Chatham Isl.: Wreck Bay, abundant in a dense growth of *Lycopodium clavatum* and other ferns at 2050 ft. (no. 858). Duncan Isl.: common in a restricted area among rocks at 1300 ft. (no. 859). James Isl.: James Bay, occasional above 2000 ft. (no. 860). Further distr. Mex., W. Ind., S. Am., Africa.

A. serratum L. Sp. Pl. 1079 (1753); Rob. (1), 108.—Galapagos Ids.: *Capt. Wood.* Chatham Isl.: acc. to Moore. Further distr. Mex., W. Ind., S. Am., Polynesia.

A. sulcatum Lam. Ency. II. 308 (1786). *A. auritum* Sw. Fl. Ind. Occ. 1616 (1806); Rob. (1), 106.—Abingdon Isl.: common on the south side of the mountain at 1950 ft. and to some extent lower down (no. 806). Albemarle Isl.: Villamil, common on the trunks and branches of trees, 500-1300 ft., (no. 804). Charles Isl.: common on moist shady rocks at 1000 ft. and on the branches of trees in protected places around 1700 ft. (nos. 808-811). Chatham Isl.: Wreck Bay, fairly common on the branches of trees at 700 ft. (no. 805). Indefatigable Isl.: Academy Bay, common on the branches of trees above 600 ft., especially abundant on trees of *Pisonia floribunda,* (nos. 815-816). James Isl.: James Bay, abundant in lava caverns at 1000 ft. and on the branches of trees above 2000 ft. (nos. 812-814). Further distr. Mex., W. Ind., S. Am. The Galapagos form of this species is considered a variety by some authors.

Var. **macilentum** Moore, Ind. Fil. 115 (1859); Rob. (1), 107.—Galapagos Ids.: acc. to Moore. Further distr. Mex., W. Ind., S. Am., Old World.

Blechnum L.

B. blechnoides (Lag.) C. Chr. Ind. 151 (1905). *Asplenium blechnoides* Lag. Sw. Syn. 76 (1806). *B. unilaterale*

Sw. Berl. Mag. 79, t. 3, f. 1 (1810).—CHATHAM ISL.: Wreck Bay, common in open country and on exposed rocks 1700-2000 ft. (nos. 780-781). Further distr. Mex., W. Ind., northern S. Am.

B. occidentale L. Sp. Pl. 1077 (1753); Rob. (1), 108.—ABINGDON ISL.: south side, common above 1000 ft. ALBEMARLE ISL.: Tagus Cove, common in lava caverns at 2200 ft. where the rocks are kept constantly moist from a seepage of water (no. 863); Villamil, in lava caverns, on the sides of moist cliffs, and in open woodland at 1350 ft. (no. 862). CHARLES ISL.: in protected places around 1600 ft. (nos. 864-866). CHATHAM ISL.: *Baur.* DUNCAN ISL.: in protected places at 1250 ft. (no. 867). JAMES ISL.: James Bay, common on moist shady rocks at 2150 ft. (nos. 868-869). Further distr. Mex., W. Ind., S. Am.

Var. **caudatum** Hook. Sp. Fil. III. 51 (1860); Rob. (1), 108.—GALAPAGOS IDS.: *Capt. Wood.* Further distr. Mex., S. Am., Philippines.

Ceropteris Link

C. tartarea (Cav.) Link, Fil. Sp. 142 (1841). *Acrostichum tartaraeum* Cav. Desc. 242 (1802). *Gymnogramme tartarea* Desv. Berl. Mag. V. 305 (1811); Rob. (1), 109.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, occasional on the floor of the crater at 2750 ft., form with very coriaceous fronds, (no. 893). BINDLOE ISL.: near steam jets in the interior of the island (no. 888). CHARLES ISL.: occasional above 1400 ft. CHATHAM ISL.: Wreck Bay, fairly abundant in open grassy country above 1700 ft. (no. 889). DUNCAN ISL.: in moist shady places in vegetable mold at 1300 ft. (No. 890). JAMES ISL.: James Bay, occasional in lava caverns at 900 ft. and in moist places at 2150 ft. (nos. 891-892). Further distr. Mex., W. Ind., S. Am., tropics of the Old World.

Cheilanthes Sw.

C. microphylla Sw. Syn. Fil. 127 (1806); Rob. (1), 108.—ABINGDON ISL.: occasional on rocks at 450 ft., common at

1050 ft., (nos. 872-873). Albemarle Isl.: Cowley Bay, common at 2000 ft. (no. 877); Iguana Cove, abundant in shady places near the shore (nos. 874-875); Tagus Cove, common in lava crevices around 2100 ft. (no. 876). Charles Isl.: rare at 1400 ft. (no. 878). Chatham Isl.: Wreck Bay, *Baur.* Indefatigable Isl.: southeast side, occurs first at 350 ft. where a few stunted specimens were found growing in lava crevices, common in woodland at 625 ft., (nos. 879-881). Further distr. S. U. S., Mex., W. Ind., S. Am.

C. myriophylla Desv. Berl. Mag. V. 328 (1813); Rob. (1), 109.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller.* Further distr. Mex., Ecuador to Peru, India.

Cyclopeltis J. Sm.

C. semicordata (Sw.) J. Sm. Bot. Mag. 72, Comp. 36 (1846). *Polypodium semicordatum* Sw. Prodr. 132 (1788). *Aspidium semicordatum* Sw. Syn. Fil. 45 (1806); Rob. (1), 106.—Galapagos Ids.: *Capt. Wood.* Further distr. Mex., W. Ind., S. Am., Old World.

Cystopteris Bernh.

C. fragilis (L.) Bernh. in Schrad. Neues Jour. Bot. I. pt. 2, 26, 49, t. 2, f. 9 (1806). *Polypodium fragile* L. Sp. Pl. 1091 (1753). *C. fragilis* Bernh. l. c.; Rob. (1), 109.—Charles Isl.: acc. to Wolf. Robinson l. c. has already expressed some doubt about the identity of the Galapagos Island specimen. As this was one of the islands most thoroughly explored by our party, and as this species does not appear in the collection, it seems very likely that Wolf was wrong in his determination. Widely distributed.

Doryopteris J. Sm.

D. concolor (Langsd. & Fisch.) Kuhn. v. Deck. Reis. III. 3 Bot. 19 (1879). *Pteris concolor* Langsd. & Fisch. Ic. Fil. 19, t. 21 (1810). *Pellaea geraniaefolia* Fée Gen. Fil. 130 (1850-1852); Rob. (1), 111.—Galapagos Ids.: *Douglas.*

Owing to the fact that this fern has not reappeared in any of the recent collections from these islands it seems not at all unlikely that the specimen collected by *Douglas* was *D. pedata* which resembles this species very much in general appearance. Further distr. general in tropical regions.

D. pedata (L.) Fée Gen. Fil. 133 (1850-1852). *Pteris pedata* L. Sp. Pl. 1075 (1753); Rob. (1), 114.—Abingdon Isl.: occasional above 1000 ft., reported by *F. X. Williams.* Albemarle Isl.: Cowley Bay, occasional in shady places above 2100 ft. (no. 1001); Iguana Cove, common in shady places at 250 ft. (no. 1003); Tagus Cove, occasional in lava crevices at 4000 ft.; Villamil, common in woodland, 450-1300 ft. (no. 1011). Charles Isl.: rare at 1650 ft. (no. 1006). Chatham Isl.: Wreck Bay, occasional in shady woodland at 650 ft., and in open country at 2100 ft. around the summit of the mountain, (nos. 1004-1005). Indefatigable Isl.: Academy Bay, occasional in rather open places in the vegetation around 300 ft., above 600 ft. it is found growing among dense vegetation where it is more abundant and larger than at the lower elevation, (no. 1008); southeast side, above 600 ft. (no. 1007); northwest side, first seen at 650 ft. James Isl.: James Bay, occasional among rocks at 900 ft., abundant in woodland at 2100 ft., (nos. 1009-1010). Further distr. Mex., W. Ind., S. Am.

Dryopteris Adans.

D. brachyodus (Kze.) O. Ktze. Rev. Gen. Pl. II. 812 (1891). *Polypodium brachyodus* Kze. Linnaea IX. 48 (1834). *Nephrodium brachyodon* Hook. Sp. Fil. IV. 83 (1862); Rob. (1), 110.—Galapagos Ids.: *Capt. Wood.* Further distr. Mex., W. Ind., S. Am., Old World.

D. furcata (Kl.) O. Ktze. Rev. Gen. Pl. II. 812 (1891). *Aspidium furcatum* Kl. Linn. XX. 371 (1847). *Polypodium paleaceum* Hook. f. (3), 166; Rob. (1) 112.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller;* Villamil, occasional in lava caverns at 1350 ft. (no. 959). Charles Isl.: occasional on moist rocks at 1000 ft. (no. 957). Chatham

Isl.: Wreck Bay, occasional in moist shady places at 650 ft. (no. 960). Indefatigable Isl.: Academy Bay, occasional in open places in the vegetation at 550 ft. (no. 963). James Isl.: James Bay, common on moist shady banks at 2750 ft. (nos. 961-962). Further distr. S. Am.

D. parasitica (L.) O. Ktze. Rev. Gen. II. 811 (1891). *Polypodium parasiticum* L. Sp. Pl. 1090 (1753). *Nephrodium molle* Desv. Mém. Soc. Linn. VI. 258 (1827); Rob. (1), 110.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller;* Villamil, in lava caverns at 1350 ft. and in protected places at 3150 ft. (nos. 904-905). Charles Isl.: common on moist rocks at 1000 ft. (nos. 908-910). Chatham Isl.: Wreck Bay, occasional in shady places at 1000 ft., abundant at 2100 ft. (nos. 906-907). Duncan Isl.: occasional in moist shady places at 1300 ft. (no. 911). James Isl.: James Bay, abundant around 2000 ft. (nos. 912-913). Further distr. Mex., W. Ind., S. Am., tropics of the Old World.

D. pseudotetragona Urban, Symb. Ant. IV. 20 (1903). *Nephrodium tetragonum* Presl, Rel. Haenk. I. 35 (1825).—Indefatigable Isl.: Academy Bay, common in dense shade above 550 ft. (nos. 884-885). Further distr. southern U. S., Mex., northern S. Am.

D. reticulata (L.) Urban, Symb. Ant. IV. 22 (1903). *Polypodium reticulatum* L. Syst. Nat. ed. 10, 2, 1352 (1759). Indefatigable Isl.: Academy Bay, rare in shady places above 550 ft. (no. 900). Further distr. Mex., W. Ind., northern S. Am.

D. rudis (Kze.) C. Chr. Ind. 289 (1905). *Polypodium rude* Kze. Linnaea XIII. 133 (1839); Rob. (1), 113.—Galapagos Ids.: *Capt. Wood.* Further distr. Mex., northern S. Am.

D. tricholepis (Bak.) C. Chr. Ind. 298 (1905). *Nephrodium tricholepis* Bak. Hems. Biolog. Cent. Am. Bot. III. 651 (1885).—Chatham Isl.: Wreck Bay, common in moist places at 2000 ft. (no. 914). James Isl.: James Bay, common at 2150 ft. (no. 915). Further distr. Mex.

D. villosa (L.) O. Kze. Rev. Gen. II. 814 (1891). *Polypodium villosum* L. Sp. Pl. 1093 (1753). *Nephrodium villosum* Presl, Rel. Haenk. I. 38 (1830); Rob. (1), 110.—Chatham Isl.: *Capt. Wood.* Further distr. Mex., W. Ind., S. Am.

Elaphoglossum Schott

E. muscosum (Sw.) Moore, Ind. Fil. 362 (1857). *Acrostichum muscosum* Sw. Fl. Ind. Occ. 1591 (1806); Rob. (1), 104.—Albemarle Isl.: Villamil, abundant on the sides of steep banks on the south side of the mountain at 3150 ft. (no. 775). James Isl.: *Darwin.* Further distr. Mex., W. Ind., S. Am.

E. petiolatum (Sw.) Urban, Symb. Ant. IV. 61 (1903). *Acrostichum petiolatum* Sw. Prod. 128 (1788). *A. viscosum* Sw. Syn. Fil. X. 193 (1806); Rob. (1), 105.—James Isl.: *Darwin.* Widely distributed in tropical regions.

Gleichenia Sm.

G. linearis (Burm.) Clarke, Trans Linn. Soc. II. Bot. I. 428 (1880). *Polypodium lineare* Burm. Fl. Ind. 235, t. 67, f. 2 (1768). *G. dichotoma* Hook. Sp. Fil. I. 12 (1846); Rob. (1), 109.—Chatham Isl.: Wreck Bay, occasional in shady protected places at 1300 ft., abundant 1800-2100 ft., (no. 886). Duncan Isl.: rare at 1300 ft. (no. 887). Further distr. general in tropical regions.

Hemitelia R. Br.

H. multiflora (Sm.) R. Br. Prod. Fl. N. Hol. 158 (1810). *Cyathia multiflora* Sm. Mém. Ac. V. 416 (1793).—Albemarle Isl.: Villamil, common on the south, east, and southeast inner walls of the crater at 3150 ft. and occasional on the outside above 2450 ft. (no. 894). Chatham Isl.: Wreck Bay, trees 6-10 ft. high common on the south and southeast sides of the main mountain at 1800-2000 ft. (no. 895). James Isl.: James Bay, trees 8-10 ft. high on south and southeast sides above 2750 ft., forming a well marked belt, (no. 896). Further distr. W. Ind., S. Am.

Histiopteris Agardh.

H. incisa (Thbg.) J. Sm. Hist. Fil. 295 (1875). *Pteris incisa* Thbg. Fl. Cap. 733 (1823); Rob. (1), 114.—Abingdon Isl.: occasional around 1950 ft. (no. 997). Albemarle Isl.: Villamil, common in the upper moist regions (nos. 998, 1000). James Isl.: James Bay, abundant in the moist regions (no. 999). Further distr. general in tropical regions.

Hymenophyllum Sm.

H. hirsutum (L.) Sw. Schrad. Jour. 1800, 2, 99 (1801). *Trichomanes hirsutum* L. Sp. Pl. 1098 (1753).—Chatham Isl.: Wreck Bay, abundant in moist shady places around 1750 ft. (no. 898). Further distr. Mex., W. Ind., Brazil, Mascarine Ids.

H. polyanthos Sw. Schrad. Jour. 1800, 2, 102 (1801).—Duncan Isl.: in dense tufts on the southeast sides of rocks at 1300 ft. (no. 899). Widely distr. in tropical regions.

Hypolepis Bernh.

H. repens (L.) Presl, Tent. Pterid. 162 (1836). *Lonchitis repens* L. Sp. Pl. 1078 (1753). *H. repens.* Presl, l. c.; Rob. (1), 109.—Galapagos Ids.: *Capt. Wood.* Further distr. Mex., W. Ind., S. Am.

Nephrolepis Schott

N. biserrata (Sw.) Schott, Gen. Fil. ad t. 3 (1834). *Aspidium biserratum* Sw. Schrad. Jour. 1800, 2, 32 (1801). *N. acuta* Presl, Tent. Pterid. 79 (1836); Rob. (1), 110.—Abingdon Isl.: forming heavy brakes above 1650 ft. (nos. 916-917). Albemarle Isl.: Villamil, abundant in the vicinity of the shore, forming brakes 6 or more ft. in height. The area in which this fern occurs at this place is very limited and its presence here is due to several seepages of comparatively fresh water coming down from the upper parts of the island through crevices in the lava. This is one of the very few places on the islands where ferns occur at sea level, (no. 921).

Bindloe Isl.: common in moist places in the interior (no. 920). James Isl.: James Bay, occasional in lava caverns around 1000 ft. (no. 918). Wenman Isl.: common in lava caverns and on the sides of the cliffs (no. 919). Further distr. Mex., W. Ind., S. Am., tropics of the Old World.

N. pectinata (Willd.) Schott, Gen. Fil. ad t. 3 (1834). *Aspidium pectinatum* Willd. Sp. V. 223 (1810). *N. pectinata* Schott. l. c.; Rob. (1), 110.—Abingdon Isl.: covering tree trunks and sides of banks around 1950 ft. (no. 992). Albemarle Isl.: Villamil, abundant on the sides of lava crevices at 1350 ft. (no. 928). Chatham Isl.: Wreck Bay, common on the trunks of tree ferns, *Hemitelia multiflora*, at 1800 ft. and in dense growths of *Lycopodium clavatum* and ferns at 2100 ft. (no. 926). Duncan Isl.: in shady protected places on the south side of the island at 1300 ft. (no. 924). Indefatigable Isl.: Academy Bay, occasional in shady woodland above 500 ft. James Isl.: James Bay, occasional at 150 ft. in crevices in the recent lava south of the bay, occasional in lava caverns at 900 ft. From 2150-2850 ft. it is very abundant on the trunks of trees, often completely covering them with a dense network of fibrous roots. The roots of this fern seem to contain a volatile oil, as they burn with great intensity when ignited, (nos. 923-925). Further distr. Mex., W. Ind., S. Am., Old World.

Notholaena R. Br.

N. sulphurea (Cav.) J. Sm. Bot. Voy. Herald 233 (1852-1857). *Pteris sulfurea* Cav. Descr. 269 (1802). *Nothochleana sulphurea* J. Sm. l. c.; Rob. (1), 111.—Albemarle Isl.: Elizabeth Bay, mountain north of, *Snodgrass and Heller;* Cowley Bay, on rocks at 1450 ft. (no. 932); Iguana Cove, abundant above 200 ft. (no. 930); Tagus Cove, in lava crevices 300-2900 ft. (no. 931). James Isl.: James Bay, occasional on the walls of a small tufa crater, south of the bay, at 75 ft., (no. 933). Narborough Isl.: common on the north side above 500 ft. (no. 934). This is usually one of the first ferns to be seen in going up the sides of the mountains. Further distr. S. W. U. S., Mex., Andean S. Am.

Polypodium L.

P. angustifolium Sw. Prod. 130 (1788); Rob. (1), 111.—JAMES ISL.: James Bay, on the trunks and branches of trees around 2100 ft. (no. 935). Further distr. Mex., W. Ind., S. Am.

P. aureum L. Sp. Pl. 1087 (1753); Rob. (1), 111.—ALBEMARLE ISL.: Villamil, common on rocks at 1500 ft., also common on the trunks and branches of *Zanthoxylum Fagara* at 3150 ft., (nos. 936-937). DUNCAN ISL.: occasional on the sides of perpendicular cliffs at 1250 ft. (no. 939). JAMES ISL.: James Bay, common on the trunks of trees at 2150 ft. and in similar situations at 2800 ft. (no. 938). Further distr. S. U. S., Mex., W. Ind., S. Am., "Australia" acc. to Rob. (1), 111.

P. crassifolium L. Sp. Pl. 1083 (1753); Rob. (1), 112.—ALBEMARLE ISL.: Tagus Cove, in the upper regions on the southeast side of the mountain (no. 941). INDEFATIGABLE ISL.: Academy Bay, occasional in dense shade at 550 ft. (no. 940). Further distr. Mex., W. Ind., northern S. Am.

P. lanceolatum L. Sp. Pl. 1082 (1753); Rob. (1), 112.—ABINGDON ISL.: common on trees above 1650 ft. (no. 946). ALBEMARLE ISL.: Iguana Cove, common on trees above 400 ft. (no. 948); Villamil, common on the trunks and branches of trees, 350-3150 ft., (no. 951). CHARLES ISL.: common on trees at 1000-1700 ft. (no. 950). DUNCAN ISL.: occasional on bushes and small trees at 1300 ft. (no. 949). INDEFATIGABLE ISL.: Academy Bay, common on tree trunks above 400 ft. (no. 947). JAMES ISL.: *Darwin.* Further distr. tropics of both hemispheres.

P. lepidopteris (Langsd. & Fisch.) Kze. Linnaea XIII. 132 (1839). *Acrostichum lepidopteris* Langsd. & Fisch. Ic. Fil. V. t. 2 (1810). *P. lepidopteris* Kze. l. c.; Rob. (1), 112.—ALBEMARLE ISL.: Villamil, common on trunks and branches of trees, 500-600 ft., (no. 952). DUNCAN ISL.: occasional on bushes and small trees at 1200 ft.; nearly all of the specimens are small, a fact which is probably due to the somewhat xerophytic conditions which prevail around the top of this island,

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(no. 954). INDEFATIGABLE ISL.: Academy Bay, on trees, 375-450 ft., (no. 956); southeast side, rare on trees at 625 ft. JAMES ISL.: James Bay, on trees at 1300 ft. (no. 955). This fern is usually found in the transition and lower moist regions. Further distr. Mex., S. Am.

P. loriceum L. Sp. Pl. 1086 (1753); Rob. (1), 112.—GALAPAGOS IDS.: *Moore.* Further distr. Mex., W. Ind., S. Am.

P. pectinatum L. Sp. Pl. 1085 (1753); Rob. (1), 113.—ABINGDON ISL.: occasional among rocks in the wooded region above 1000 ft. (no. 961). ALBEMARLE ISL.: Cowley Bay, occurs first among rocks in shady woodland at 2000 ft. Below this elevation the soil is composed entirely of pumice, which is not well adapted to support a fern flora; Iguana Cove, among rocks in woodland near the shore; Tagus Cove, common in lava caverns at 2200 ft. and on the west side of the mountain at 4000 ft. (no. 967); Villamil, common among rocks 100-3150 ft. (no. 969). CHARLES ISL.: common in lava crevices on the inner walls of the main crater at 1400 ft. (no. 968). CHATHAM ISL.: Wreck Bay, fairly abundant in shady woods at 700 ft. (no. 966). INDEFATIGABLE ISL.: Academy Bay, common in vegetable mold among rocks, 350-500 ft., (no. 962); northwest side, occasional at 1000 ft.; southeast side, common among rocks at 625 ft. JAMES ISL.: James Bay, common above 1300 ft. (no. 966). This fern is most abundant in the lower part of the moist region but usually disappears when the vegetation becomes dense. Further distr. Mex., W. Ind., S. Am.

P. percussum Cav. Prael. 243 (1801); Rob. (1), 113.—GALAPAGOS IDS.: *Capt. Wood.* Further distr. Mex., S. Am.

P. Phyllitides L. Sp. Pl. 1083 (1753); Rob. (1), 113.—JAMES ISL.: James Bay, common in open woodland above 1500 ft. (no. 969). "Large sword ferns" were reported from the upper regions of ABINGDON ISL., and Banks Bay, ALBEMARLE ISL. by *Mr. F. X. Williams,* the entomologist of the expedition. From his description it seems very likely that it was this species that he saw. Further distr. S. U. S., Mex., W. Ind., S. Am.

P. pleiosoros Hook. f. (3), 166 (as *pleiosorum*); Rob. (1), 113.—JAMES ISL.: *Darwin*. Endemic.

P. polypodioides (L.) Hitchcock, Rep. Mo. Bot. Gard. IV. 156 (1893). *Acrostichum polypodioides* L. Sp. Pl. 1068 (1753). *P. incanum* Sw. Prod. 131 (1788); Rob. (1), 112. —ALBEMARLE ISL.: Villamil, common on the trunks of trees at 600 ft. (no. 944). CHARLES ISL.: *Darwin*. INDEFATIGABLE ISL.: Academy Bay, on the trunks and branches of trees above 425 ft. (no. 942); southeast side, common on tree trunks at 625 ft. (no. 943). Widely distributed.

P. squamatum L. Sp. Pl. 1086 (1753); Rob. (1), 113.—ABINGDON ISL.: common on rocks at 450 ft., occasional on the trunks and branches of trees on the upper parts of the island, (no. 978). ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, common in lava crevices at 2800 ft. (no. 986); Villamil, common on recent lava near the shore and in woodland above 350 ft. BINDLOE ISL.: common on lava in the upper interior parts of the island (no. 971). CHARLES ISL.: occasional in open woodland at 1000 ft., abundant at 1400 ft., (no. 972). CHATHAM ISL.: Basso Point, first seen at 900 ft.; Wreck Bay, abundant in shady woodland at 600 ft., fairly common in open country at 1700 ft., occasional at 2100 ft., (nos. 973-974). DUNCAN ISL.: occurs first at 1000 ft. on the north side of the island, and at 700 ft. on the south side where the vegetation is bathed by the fog-laden wind, common at 1300 ft. on the south side, (no. 975). HOOD ISL.: occasional on the southeast side of cliffs at 600 ft. (no. 979). INDEFATIGABLE ISL.: Academy Bay, occasional at 50 ft., abundant, covering rocks in open woodland, at 350-500 ft., (no. 985); northwest side, occasional at 650 ft.; southeast side, occasional at 600 ft., forming low brakes around 700 ft., (no. 987). JAMES ISL.: James Bay, abundant on recent lava beds above 500 ft., apparently one of the first vascular plants to invade the recent lava above this elevation, (no. 977). JERVIS ISL.: occasional in a very limited area around 1050 ft. (no. 984). NARBOROUGH ISL.: south side, common in the upper regions. Further distr. Mex., W. Ind., northern S. Am.

P. thyssanolepis A. Br. Kl. Linn. XX. 392 (1847).—Albemarle Isl.: Villamil, abundant at 600 ft., on trees at 1300 ft., (nos. 989-990). James Isl.: James Bay, occasional on the trunks of trees at 2750 ft. (no. 991). Further distr. S. U. S., Mex., W. Ind., northern S. Am.

Polystichum Roth.

P. aculeatum (L.) Schott, Gen. Fil. ad t. 9 (1834). *Polypodium aculeatum* L. Sp. Pl. 1090 (1753). *Aspidium aculeatum* Sw. Schrad. Jour. 1800, 2, 37 (1801).—Albemarle Isl.: Villamil, occasional on the south side of the mountain at 3150 ft. (no. 802). Widely distributed.

P. adiantiforme (Forst.) J. Sm. Hist. Fil. 220 (1875). *Polypodium adiantiforme* Forst. Prod. 82 (1786). *Aspidium coriaceum* Sw. Syn. Fil. 57 (1806); Rob. (1), 106.—Albemarle Isl.: Villamil, occasional on the south side of the mountain at 3150 ft. (no. 803). James Isl.: *Darwin.* Further distr. W. Ind., S. Am., Old World.

P. apiifolium (Sw.) C. Ch. Ind. 64 (1905), 578 (1906). *Dicksonia apiifolia* Sw. Schrad. Jour. 1800, 2, 91 (1801).—James Isl.: James Bay, occasional at 2000 ft. (nos. 882-883). Further distr. Mex., W. Ind., Andean S. Am.

Pteris L.

P. aquilina var. **esculenta** Hook. f. Fl. N. Zeal. II. 25 (1855); Rob. (1), 114.—Abingdon Isl.: forms extensive brakes on the south side of the island above 1600 ft. (no. 992). Albemarle Isl.: Iguana Cove, *Snodgrass and Heller;* Villamil, common in open woodland, 1200-1400 ft.; also common on the southeast side of the mountain at 3150 ft., and on the floor of the crater at 2750 ft., where it forms extensive brakes, (no. 993). Chatham Isl.: Wreck Bay, occurs first at 1000 ft., forming extensive brakes at 1700 ft., common at 2100 ft., (nos. 994-996). Further distr. general in tropical regions.

P. propinqua var. **Cumingiana** Ag. Sp. Gen. Pterid. 65 (1839); Rob. (1), 115.—Galapagos Ids.: *Capt. Wood.* Further distr. Mex., northern S. Am.

Trachypteris André

T. pinnata (Hook. f.) C. Chr. Ind. 634 (1906). *Hemionitis pinnata* Hook. f. Trans. Linn. Soc. XX. 167 (1847). *Acrostichum aureonitens* Hook. f. Ic. Pl. X. t. 933 (1854); Rob. (1), 104.—ABINGDON ISL.: abundant on rocks at 600-1000 ft. (no. 772). ALBEMARLE ISL.: Cowley Bay, common around 2000 ft.; Iguana Cove, abundant on shady rocks near the shore (no. 768); Tagus Cove, abundant at 500-4000 ft. (nos. 766-767); Villamil, on rocks in shady places, 100-1300 ft., (no. 771). CHARLES ISL.: common on moist rocks at 1000 ft. (no. 1026). CHATHAM ISL.: Basso Point, on rocks at 900 ft.; Wreck Bay, occasional at 900 ft. INDEFATIGABLE ISL.: Academy Bay, occasional on the sides of steep bluffs at 50 ft., abundant above 350 ft., (no. 766); southeast side, rare at 450 ft., abundant above 500 ft. JAMES ISL.: James Bay, on rocks in open woodland, 800-1300 ft., (no. 770). NARBOROUGH ISL.: south side, *Snodgrass and Heller.*

Trichomanes L.

T. pusillum Sw. Prod. 136 (1788).—JAMES ISL.: James Bay, common on moist tufa walls at 2050 ft. (no. 1012). Further distr. Mex., W. Ind., northern S. Am., Africa.

Vittaria J. Sm.

V. angustifolia (Sw.) Bak. Fl. Bras. I. 2, 544 (1870). *Pteris angustifolia* Sw. Prod. 129 (1788). *Taenitis angustifolia* R. Br. Prod. 154, in note (1810); Rob. (1), 115.—GALAPAGOS IDS.: *Capt. Wood.* Further distr. Mex., W. Ind., S. Am.

SALVINIACEAE

Azolla Lam.

A. caroliniana Willd. Sp. V. 541 (1810); Rob. (1), 115.—CHARLES ISL.: abundant on mud and floating in water around springs at 1000 ft. (no. 3441). CHATHAM ISL.: Wreck Bay, common in small streams, 1000-1700 ft., (no. 3442). Further distr. U. S., Mex., S. Am.

Salvinia L.

S. sp. Wolf, (1), 284; Rob. (1), 115.—Charles Isl.: in brooks near the hacienda, acc. to Wolf l. c.

EQUISETACEAE

Equisetum L.

E. bogotense HBK. Nov. Gen. & Sp. I. 42 (1815).—Albemarle Isl.: Villamil, rare on the south rim of the crater at 3150 ft. (no. 3443). Further distr. Mex. (Cent. Am.), W. Ind., S. Am.

LYCOPODIACEAE

Lycopodium L.

L. clavatum L. Sp. Pl. 1101 (1753); Rob. (1), 115.—Chatham Isl.: Wreck Bay, forming thick tangled masses 2-3 ft. high above 1500 ft. (no. 1014). James Isl.: James Bay, rare around 2500 ft. (no. 1015). Widely distributed.

L. complanatum L. Sp. Pl. 1104 (1753).—Albemarle Isl.: Villamil, occasional at 3150 ft. (no. 1016). Widely distributed.

L. dichotomum Jacq. Enum. Vindob. 314 (1762); Rob. (1), 115.—Albemarle Isl.: Villamil, common on the higher branches of trees, 500-700 ft., (no. 1017). Indefatigable Isl.: Academy Bay, on the trunks and branches of trees, 400-500 ft., (no. 1019); northwest side, common on the higher branches of *Psidium galapageium* trees above 1000 ft. Further distr. Mex., W. Ind., S. Am., Madagascar.

L. reflexum Lam. Encyc. III. 653 (1789).—Albemarle Isl.: Villamil, common at 3150 ft. (no. 1020). Further distr. Mex., W. Ind., S. Am.

L. taxifolium Sw. Fl. Ind. Occ. III. 1573 (1806).—Charles Isl.: abundant on branches of *Acnistus ellipticus* trees at 1700 ft. (no. 1021). Wolf l. c. 283 refers to two undetermined species of *Lycopodium* from this island and it seems likely that this is one of them. James Isl.: James Bay, common on the branches of *Zanthoxylum Fagara* trees at 2150 ft. (nos. 1023-1024). Further distr. Mex., W. Ind., northern S. Am.

SPERMATOPHYTA

MONOCOTYLEDONEAE

POTAMOGETONACEAE

Potamogeton Tourn.

P. pectinatus L. Sp. Pl. 127 (1753); Rob. (1), 115.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller.* Widely distributed.

Ruppia L.

R. maritima L. Sp. Pl. 127 (1753); Rob. (1), 116.—Albemarle Isl.: Elizabeth Bay, *Snodgrass and Heller.* Widely distributed.

NAJADACEAE

Najas L.

N. marina L., var. **latifolia** A. Br. ex Schum. in Mart. Fl. Bras. III. pt. 3, 725 (1894); Rob. (1), 116.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller.* Further distr. tropical S. Am.

GRAMINEAE

Ammophila Host.

A. arenaria (L.) Link, Hort. Berol. I. 105 (1827). *Arundo arenaria* L. Sp. Pl. 82 (1753).—Seymour Isl., south: forming a patch about one-fourth mile long on a sand beach on the west side of the island. The specimen is sterile and somewhat doubtful as to species, (no. 1195). Further distr. N. Am., Europe.

Anthephora Schreb.

A. hermaphrodita (L.) O. Kze. Rev. Gen. II. 759 (1891). *Tripsacum hermaphroditum* L. Sp. Pl. ed. 2, 1397 (1763). *Anthephora elegans* Schreb. Beschr. Gräs. II. 105 t. 44 (1810); Rob. (1), 116.—Albemarle Isl.: Tagus Cove, occasional in tufaceous soil in open sunny places on the lower parts (no. 1196). CHARLES ISL.: rare at 850 ft., common in tufaceous soil at 1200 ft., (nos. 1197-1198). CHATHAM ISL.: north side, *Baur.* INDEFATIGABLE ISL.: northwest side, *Andersson.* JAMES ISL.: James Bay, *Snodgrass and Heller.* Further distr. Mex., W. Ind., S. Am.

Aristida L.

A. divulsa Anderss. (1), 143, and (2), 49; Rob. (1), 116.— ABINGDON ISL.: *Snodgrass and Heller.* BINDLOE ISL.: *Baur.* CHATHAM ISL.: Sappho Cove, occasional in bunches on the recent lava in the vicinity of the cove, (no. 1200). JAMES ISL.: James Bay, common in lava crevices near the shore (no. 1199). Endemic.

A. repens Trin. Mém. Acad. Pétersb. ser. VI. I. 87 (1831); Rob. (1), 117.—JAMES ISL.: *Douglas.* Endemic.

A. subspicata Trin. & Rupr. Mém. Acad. Pétersb. ser. VI. I. 125 (1842); Rob. (1), 117.—ABINGDON ISL.: common in lava crevices in the vicinity of the shore and also sparingly at 1100 ft. (nos. 1201-1203). ALBEMARLE ISL.: Cowley Bay, common in soil of pumiceous origin at 1000 ft. (no. 1207); Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, common on the side of the cliffs above the cove, also common in open places around 300 ft., (no. 1206); Tagus Cove, common in open country near the shore and around 1000 ft. (no. 1208); Villamil, common in lava crevices near the shore (nos. 1204-1205). BARRINGTON ISL.: occasional in loose soil among masses of lava (no. 1210). BINDLOE ISL.: common near the shore and on the crests of tufa ridges in the interior of the island (no. 1211). BRATTLE ISL.: (no. 1212). CHARLES ISL.: abundant at 850 ft., occasional at 1750 ft., (nos. 1213, 1214, 1216, 1217); Cormorant Bay, occasional in lava crevices (no. 1215). CHATHAM ISL.: Basso Point, occasional on lava and in open places in the dry region where the soil is very loose in texture (no. 1218). GARDNER ISL. (near HOOD ISL.): common everywhere (no. 1219). HOOD ISL.: occasional among rocks (no. 1220). INDEFATIGABLE ISL.: Academy Bay, abundant in open places in the vegetation on the lower parts (no. 1221); north side, abundant in ashy soil on the lower parts (no. 1224); northeast side, abundant on the flat area near the shore (no. 1222); northwest side, common in tufaceous soil (no. 1225). James Isl.: James Bay, *Snodgrass and Heller;* northeast side, occasional in sand and in lava crevices (no. 1226). Narborough Isl.: north side, abundant in lava crevices (no. 1227). Seymour Ids., north and south: *Snodgrass and Heller.* Further distr. S. Am. This is one of the most abundant and wide spread grasses of the dry region. It occurs commonly where the soil is too porous to support much large vegetation, and in such situations it often covers considerable areas.

A. villosa Rob. & Greenm. (1), 144, 149; Rob. (1), 117.—Duncan Isl.: abundant on the lower and dry parts of the island (nos. 1228-1229). Jervis Isl.: *Baur.* Endemic.

Bouteloua Lag.

B. pilosa (Hook. f.) Benth. acc. to Watson, Proc. Am. Acad. XVIII. 179 (1883). *Eutriana pilosa* Hook. f. (3), 173. *B. pilosa* Benth. l. c.: Rob. (1), 117.—Abingdon Isl.: occasional in open places at 1050 ft. (no. 1230). Albemarle Isl.: Iguana Cove, in spreading bunches among thick vegetation at 250 ft. (no. 1231); Tagus Cove, abundant in tufaceous soil on the lower parts of the island (no. 1232); Villamil, occasional in woodland at 250 ft. (no. 1233). Barrington Isl.: *Snodgrass and Heller.* Chatham Isl.: north side, *Andersson.* Indefatigable Isl.: north side, *Snodgrass and Heller.* James Isl.: James Bay, *Snodgrass and Heller.* Jervis Isl.: *Baur.* Narborough Isl.: north side, abundant on lava beds near the shore (no. 1234). Seymour Ids., north and south: *Snodgrass and Heller.* Endemic.

Cenchrus L.

C. distichophyllus Griesb. Cat. Pl. Cub. 234 (1866); Rob. (1), 118.—Albemarle Isl.: Villamil, *Baur.* Chatham Isl.: Sappho Cove, forming dense mats on sand beaches (no. 1236). Hood Isl.: fairly common on sand beaches (no. 1235). Further distr. Cuba.

C. granularis Anderss. (1), 140, and (2), 47; Rob. (1), 118.—Albemarle Isl.: Tagus Cove, common at 100-4000 ft.

(nos. 1237-1238). CHARLES ISL.: rare at 900 ft. (no. 1240). CHATHAM ISL.: *Andersson; A. Agassiz.* NARBOROUGH ISL.: north side, abundant on lava beds (no. 1239). SEYMOUR ISL., SOUTH: *Snodgrass and Heller.*

C. platyacanthus Anderss. (1), 139, (2), 47; Rob. (1), 118. —ABINGDON ISL.: occasional on the lower parts (no. 1241). ALBEMARLE ISL.: Iguana Cove, in spreading bunches on the sides of the cliffs above the cove (no. 1242). BARRINGTON ISL.: *Snodgrass and Heller.* BINDLOE ISL.: *Snodgrass and Heller.* BRATTLE ISL.: (no. 1244). CHARLES ISL.: *Snodgrass and Heller.* CHATHAM ISL.: Wreck Bay, abundant near the shore and in open places in the vegetation to 150 ft. (nos. 1245-1246). GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: *Baur.* INDEFATIGABLE ISL.: Academy Bay, abundant in sandy soil near the shore; north side, *Snodgrass and Heller.* JAMES ISL.: northeast side, occasional in lava crevices; JAMES BAY, *Snodgrass and Heller.* NARBOROUGH ISL.: *Snodgrass and Heller.* Endemic.

C. sp. Rob. (1), 118.—CHATHAM ISL.: *Snodgrass and Heller.*

Chloris Sw.

C. anisopoda Rob. (1), 118.—CHARLES ISL.: occasional among rocks near the shore (no. 1250). INDEFATIGABLE ISL.: north side, fairly abundant in lava crevices near the shore (no. 1251); southeast side, on the lower dry parts (no. 1252). Endemic.

C. elegans HBK. Nov. Gen. & Sp. I. 166, t. 49 (1815); Rob. (1), 119.—CHARLES ISL.: *Snodgrass and Heller.* SEYMOUR ISL., NORTH: *Snodgrass and Heller.* Further distr. S. W. U. S., Mex.

C. radiata (L.) Sw. Prodr. 26 (1788). *Agrostis radiata* L. Syst. 10, ed. 2, 873 (1759). *C. radiata* Sw. l. c.; Rob. (1), 119.—CHARLES ISL.: *Baur.* Further distr. W. Ind., S. Am.

Dactyloctenium Willd.

D. aegyptium (L.) Richter, Plan. Eur. I. 68 (1890). *Cynosurus aegyptius* L. Sp. Pl. 72 (1753). *Eleusine aegyptica* Desf. Fl. Alt. I. 85 (1798); Rob. (1), 119.—CHARLES ISL.:

abundant near the shore (no. 1253). Chatham Isl.: Wreck Bay, abundant in dry sandy soil near the beach (no. 1254). Hood Isl.: *Baur.* Indefatigable Isl.: Academy Bay, abundant in sand near the shore (no. 1255). Widely distributed.

Digitaria Scop.

D. sanguinalis (L.) Scop. F. Carn. ed. 2, 1, 52 (1772). *Panicum sanguinale* L. Sp. Pl. 57 (1753); Rob. (1), 123.—Charles Isl.: occasional in open places at 1100 ft. (no. 1304). Chatham Isl.: Wreck Bay, common in open sunny places to 450 ft. (nos. 1303, 1305). Of wide distribution.

Eleusine Gaertn.

E. indica Gaertn. Fruct I. 8 (1788); Rob. (1), 120.—Charles Isl.: abundant in open meadows at 1000 ft., also common at 1500-1750 ft., (nos. 1255-1258). Chatham Isl.: Wreck Bay, abundant at 300-800 ft., occasional at 1300 ft., (nos. 1259-1261). Widely distributed. Probably an introduced species on the islands.

Eragrostis Host.

E. bahiensis Roem. & Sch. Mant. II. 318 (1824); Rob. (1), 120.—Abingdon Isl.: occasional in bunches around 1000 ft. (no. 1262). Albemarle Isl.: Iguana Cove, *Snodgrass and Heller.* Further distr. S. Am.

E. ciliaris (L.) Link, Hort. Berol. I. 192 (1827). *Poa ciliaris* L. Syst. ed. 10, 875 (1760). *Eragrostis ciliaris* Link, l. c.; Rob. (1), 120.—Abingdon Isl.: *Snodgrass and Heller.* Albemarle Isl.: *Macrae;* Tagus Cove, *Snodgrass and Heller.* Bindloe Isl.: on the upper parts (no. 1263). Charles Isl.: abundant 430-1100 ft. (nos. 1264-1265). Chatham Isl.: *Darwin; Andersson; Snodgrass and Heller.* Hood Isl.: *Snodgrass and Heller.* James Isl.: James Bay, common in dry places on sides of cliffs around the bay (no. 1266). Narborough Isl.: north side, abundant on recent lava beds (no. 1267). Tower Isl.: *Baur; Snodgrass and Heller.* Widely distributed.

E. megastachya (Koehl.) Link, Hort. Berol. I. 187 (1827). *Poa megastachya* Koehl. Descr. Gram. 181 (1802). *Eragros-*

tis major Host. Gram. IV. 14, t. 24 (1809); Rob. (1), 120.—BARRINGTON ISL.: *Snodgrass and Heller.* BRATTLE ISL.: (no. 1268). CHARLES ISL.: common above 450 ft. (nos. 1269-1270). CHATHAM ISL.: Wreck Bay, common in dry sandy soil near the shore (no. 1271). DUNCAN ISL.: occasional near the shore. GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: *Snodgrass and Heller.* INDEFATIGABLE ISL.: Academy Bay, fairly abundant near the shore (no. 1272). SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* TOWER ISL.: *Snodgrass and Heller.* WENMAN ISL.: (no. 1273). Widely distributed.

E. pilosa (L.) Beauv. Agrost. 71 (1812). *Poa pilosa* L. Sp. Pl. 68 (1753). *E. pilosa* Beauv. l. c.; Rob. (1), 120.—JAMES ISL.: *Darwin.* Widely distributed.

Eriochloa HBK.

E. distachya HBK. Nov. Gen. & Sp. I. 95, t. 30 (1815); Rob. (1), 121.—CHATHAM ISL.: *Snodgrass and Heller.* Further distr. northern S. Am.

E. punctata (L.) Desv. in Ham. Prod. Pl. Ind. Occ. 5 (1825). *Milium punctatum* L. Sp. Pl. ed. 2, 91 (1763).—CHATHAM ISL.: Basso Point, occasional in open places at 900 ft. (no. 1274). Further distr. U. S., W. Ind., S. Am.

Leptochloa Beauv.

L. albemarlensis Rob. & Greenm. (1), 145, 149; Rob. (1), 121.—ABINGDON ISL.: common on lava beds at 450 ft. (no. 1275). ALBEMARLE ISL.: Villamil, *Baur;* Iguana Cove, *Snodgrass and Heller.* Endemic.

L. filiformis (Lam.) Roem. & Sch. Syst. II. 580 (1817). *Festuca filiformis* Lam. Illust. I. 191 (1791). *L. filiformis* Roem & Sch. l. c.; Rob. (1), 121.—DUNCAN ISL.: *Snodgrass and Heller.* SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* Widely distributed in tropical regions.

L. Lindleyana Kunth, Rev. Gram. II. 655, t. 215 (1829); Rob. (1), 121.—ABINGDON ISL.: occasional on lava beds in the lower dry region (no. 1276). ALBEMARLE ISL.: *Macrae;*

Cowley Bay, *Baur;* Tagus Cove, (no. 1277). BINDLOE ISL.: *Snodgrass and Heller.* CHATHAM ISL.: *Andersson.* NARBOROUGH ISL.: north side, abundant on lava beds (no. 1278). Endemic.

L. mucronata (Michx.) Kunth, Rev. Gram. I. 91 (1829). *Eleusine mucronata* Michx. Fl. Bor. Am. 65 (1803). *L. mucronata* Kunth, l. c.; Rob. (1), 121.—BARRINGTON ISL.: (no. 1279). GARDNER ISL., (near HOOD ISL.): (no. 1281). HOOD ISL.: common in scant soil among rocks (no. 1280). Further distr. S. U. S., Mex., W. Ind., S. Am.

L. virgata (L.) Beauv. Agrost. 71 (1812). *Cynosurus virgatus* L. Sp. Pl. ed. 2, 106 (1762). *L. virgata* Beauv. l. c.; Rob. (1), 121.—CHARLES ISL.: upper grassy region acc. to *Andersson.* CHATHAM ISL.: Wreck Bay, occurs first at 650 ft. (no. 1282). Further distr. Mex., W. Ind., S. Am.

Oplismenus Beauv.

O. setarius (Lam.) Roem. & Sch. Syst. II. 481 (1817). *Panicum setarium* Lam. Ill. I. 170 (1791). *O. setarius* Roem. & Sch. l. c.; Rob. (1), 121.—CHATHAM ISL.: Wreck Bay, in shady places in cultivated ground around 1000 ft. (no. 1283). Probably an introduced species. Further distr. U. S., Mex., W. Ind., S. Am.

Panicum L.

P. colonum L. Syst. ed. 10, 870 (1760); Rob. (1), 122.—CHARLES ISL.: *Darwin; Andersson.* Further distr. general in tropical regions.

P. fasciculatum Sw. Prodr. 22 (1788); Rob. (1), 122. *P. fuscum* Sw. Prodr. 23 (1788); Rob. (1), 122.—ALBEMARLE ISL.: Turtle Cove, in dense patches 4-6 ft. high in moist places near the shore (no. 1284); Villamil, in dense patches 5-6 ft. high in low places 2-3 miles back from the beach. The soil in these areas is kept moist the greater part of the time by the underflow of water from the interior of the island, (nos. 1285-1286). CHARLES ISL.: *Snodgrass and Heller.* CHATHAM ISL.: Wreck Bay, abundant on the sides of the road leading to the hacienda. This grass was only seen in January and February, when there is considerable water standing in the low places where it occurs, (no. 1286). INDEFATIGABLE ISL.: north side, *Andersson*. JAMES ISL.: James Bay, *Snodgrass and Heller*. Further distr. Mex., W. Ind., S. Am.

P. geminatum Forsk. Fl. Aeg.-Arab. 18 (1775). *P. fluitans* Retz. Obs. III. 8 (1783); Rob. (1), 122.—CHARLES ISL.: abundant on the sides of a moist cliff above a spring at 1000 ft. (nos. 1287-1288). CHATHAM ISL.: Wreck Bay, common in large bunches at 450 ft. (no. 1290). DUNCAN ISL.: common in bunches at 900 ft. (no. 1291). HOOD ISL.: on the margin of a mud lake acc. to *Snodgrass and Heller*. The dry culms of a grass, probably this one, were noticed in the dry bed of this lake in June. Further distr. W. Ind., S. Am., Old World.

P. hirticaulum J. & C. Presl, Rel. Haenk. I. 308 (1830); Rob. (1), 122.—BARRINGTON ISL.: *Snodgrass and Heller*. CHARLES ISL.: *Andersson*. CHATHAM ISL.: Wreck Bay, common in open places on the lower parts of the island, (no. 1293). GARDNER ISL., (near HOOD ISL.): dried remains of this grass were found in June (no. 1294). HOOD ISL.: abundant (no. 1297). INDEFATIGABLE ISL.: Academy Bay, abundant (no. 1297); north side, *Snodgrass and Heller;* northeast side, common on the table land above the beach (no. 1296). SEYMOUR IDS., NORTH and SOUTH: *Snodgrass and Heller*. Robinson, l. c., suggests that this grass is a recent introduction to the islands. It might be mentioned in this connection that the islands on which it occurs are frequently visited by the inhabitants of both Albemarle and Chatham Ids. Further distr. Mex.

Var. **minus** Anderss. (1), 135, and (2), 44; Rob. (1), 123. —CHARLES ISL.: *Andersson; Snodgrass and Heller*. CHATHAM ISL.: *Andersson*. Endemic.

P. molle Sw. Prod. 22 (1788); Rob. (1), 123.—CHATHAM ISL.: *Chierchia*. Further distr. W. Ind., S. Am., tropical Asia.

P. multiculmum Anderss. (1), 133, and (2), 43; Rob. (1), 123.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Turtle Cove, occasional in scant soil near the shore (no. 1298); Villamil, occasional in lava crevices near the shore (no. 1299). BARRINGTON ISL.: *Snodgrass and Heller*. CHARLES ISL.: in open places near the shore (no. 1300). CHATHAM ISL.:

Wreck Bay, occasional in low places around 300 ft. The soil is very wet in this region during the season in which the species occurs, (no. 1301). DUNCAN ISL.: *Snodgrass and Heller.* GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: common among rocks (no. 1302). Endemic.

P. serotinum (Michx.) Trin. Gram. Panic. 166 (1826). *Digitaria serotina* Michx. Fl. I. 46 (1803). *P. serotinum* Trin. l. c.; Rob. (1), 123.—CHARLES ISL.: *Edmonston.* Robinson l. c. suggests that there may have been some mistake in the identification of this specimen. Further distr. S. U. S.

P. sp.—CHARLES ISL.: (no. 1306).

P. sp.—CHATHAM ISL.: (no. 1308).

P. sp.—DUNCAN ISL.: (no. 1307).

All three of the above specimens are in too poor a condition for determination. They probably represent three distinct species.

Paspalum L.

P. canescens Anderss. (1), 132, and (2), 42; Rob. (1), 123. *P. longe-pedunculatum* Rob. (1), 124, not Le Conte.—ALBEMARLE ISL.: Cowley Bay, *Andersson;* Iguana Cove, in bunches on the sides of the cliffs above the cove (nos. 1317-1318); Tagus Cove, in large bunches, 600-4000 ft., (nos. 1309, 1319-1320); Villamil, common at 3150 ft. (no. 1311). BINDLOE ISL.: *Snodgrass and Heller.* CHARLES ISL.: *Darwin; Andersson.* CHATHAM ISL.: Wreck Bay, occasional, 450-2100 ft., (nos. 1321-1322). NARBOROUGH ISL.: north side (no. 1310). Endemic.

P. conjugatum Berg. Act. Helv. VII. 129, t. 8 (1772); Rob. (1), 123.—ALBEMARLE ISL.: Villamil, one of the commonest grasses in the region above 1500 ft. It also occurs to some extent below this elevation, (no. 1312). CHARLES ISL.: common on the sides of moist tufa walls around 1000 ft. (no. 1312). CHATHAM ISL.: Wreck Bay, common in the grassy country above 700 ft. (nos. 1314-1315). JAMES ISL.: James Bay, abundant in open places and in open woodland above 1500 ft. (no. 1316). This is the principal forage grass on the islands where it occurs. Further distr. Mex., W. Ind., S. Am., Tropical Africa.

P. distichum L. Amoen. Acad. V. 391 (1760); Rob. (1), 123.—James Isl.: Orchilla Bay, *Baur*. Further distr. tropical and subtropical regions.

P. penicillatum Hook. f. (3), 171; Rob. (1), 124.—Charles Isl.: *Darwin*. Endemic.

P. scrobiculatum L. Mant. I. 29 (1767); Rob. (1), 124.—Chatham Isl.: *Chierchia*. Further distr. general in tropics of old world.

P. sp. Rob. (1), 124.—Indefatigable Isl.: north side, *Snodgrass and Heller*. Probably a new species, acc. to Robinson, l. c.

Pennisetum Rich.

P. exalatum (Anderss.) Hook. f. & Jacks. Ind. Kew. I. 112 (1893). *Amphochaeta exalata* Anderss. (1), 137, (2), 45, t. 1, f. 2. *P. pauperum* Nees acc. to Steud. Syn. 102 (1855); Rob. (1), 119.—Albemarle Isl.: Cowley Bay, *Andersson;* Iguana Cove, occasional in dense patches 6-7 ft. high on the sides of the cliffs above the cove (no. 1323); Tagus Cove, a considerable area is covered with a dense growth of this grass around the top of the mountain, 3850-4000 ft., (no. 1324). The dried culms, collected at Elizabeth Bay and ascribed to *Chusquea* sp. by Robinson, (1), 119, no doubt belong to this species. Narborough Isl.: *Mr. R. H. Beck* reported a heavy growth of grass around the top of this island. From his description it is probably of this species. Endemic.

Setaria Beauv.

S. floriana Anderss. (1), 138, (2), 46; Rob. (1), 124.—Charles Isl.: *Andersson*. Endemic.

S. setosa (Sw.) Beauv. Agrost. 51 (1812). *Panicum setosum* Sw. Prodr. 22 (1788). *S. setosa* Beauv. l. c.; Rob. (1), 124.—Albemarle Isl.: Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, (no. 1091); Tagus Cove, abundant in tufaceous soil around the base of the mountain (no. 1090); Villamil, occasional in bunches on the lower parts (no. 1092). Barrington Isl.: *Snodgrass and Heller*. Charles Isl.: abundant around 1750 ft. (nos. 1293-1294). Chatham Isl.:

Sappho Cove, on lava beds near the shore (no. 1295); Wreck Bay, grows in shady places at 250-600 ft. (nos. 1296-1297). DUNCAN ISL.: dried remains (no. 1179). HOOD ISL.: occasional around 600 ft. (nos. 1180-1181). INDEFATIGABLE ISL.: Academy Bay, abundant in open woodland around 350 ft.; southeast side, in rather open country around 500 ft. (no. 1182). JAMES ISL.: James Bay, common on the lower parts (no. 1183). NARBOROUGH ISL.: *Snodgrass and Heller.* Further distr. tropical regions.

S. n. sp.? Hook. f. (3), 172; Rob. (1), 125.—ALBEMARLE ISL.: *Macrae.* Endemic.

Sporobolus R. Br.

S. domingensis (Trin.) Kunth, Enum. I. 214 (1833). *Vilfa domingensis* Trin. in Spreng. neue Ent. II. 59 (1821). *S. domingensis* Kunth l. c.; Rob. (1), 125.—ABINGDON ISL.: *Snodgrass and Heller.* ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller*; Tagus Cove, occasional on the lower parts and at 4000 ft. (nos. 1184-1185). HOOD ISL.: *Snodgrass and Heller.* Further distr. Mex., W. Ind.

S. indicus (L.) R. Br. Prod. I. 170 (1810). *Agrostis indica* L. Sp. Pl. 63 (1753). *S. indicus* R. Br. l. c.; Rob. (1), 125.—ALBEMARLE ISL.: Villamil, common at 3150 ft. (no. 1186). CHARLES ISL.: occasional at 1600 ft. (no. 1187). CHATHAM ISL.: Wreck Bay, occasional in bunches at 1700 ft. (no. 1188). Widely distributed.

S. virginicus (L.) Kunth, Rev. Gram. I. 67 (1829). *Agrostis virginica* L. Sp. Pl. 63 (1753). *S. virginicus* Kunth, l. c.; Rob. (1), 125.—ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Villamil, covers a considerable area on the low flat just back of the beach (no. 1189). CHARLES ISL.: common on sand beaches (no. 1190). CHATHAM ISL.: *Andersson; A. Agassiz; Snodgrass and Heller.* INDEFATIGABLE ISL.: Academy Bay, in dense mats on sand beaches (no. 1191); southeast side, common on the shore and around the borders of salt water lagoons where the soil is strongly impregnated with salt (no. 1191). JAMES ISL.: northeast side, on sand beaches. Further distr. U. S., Mex., W. Ind., S. Am.

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Stenotaphrum Trin.

S. secundatum (Walt.) O. Kze. Rev. Gen. II. 794 (1891). *Ischaemum secundatum* Walt. Fl. Car. 249 (1788). *Stenotaphrum glabrum* Trin. Fund. Agrost. 176 (1820); Rob. (1), 126.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller.* CHATHAM ISL.: Wreck Bay, forms thick mats in open country around 650 ft. (no. 1193). Further distr. tropical shores of both continents.

Stipa L.

S. rostrata Anderss. (1), 142, (2), 48; Rob. (1), 126.—CHARLES ISL.: in open places near the beach, evidently a younger specimen than the one described by *Andersson,* (no. 1194). CHATHAM ISL.: *Andersson.* Endemic.

CYPERACEAE

Cyperus L.

C. aristatus Rottb. Descr. Nov. Pl. 23, t. 6, f. 1 (1786); Rob. (1), 126.—ALBEMARLE ISL.: Iguana Cove, common in lava cracks near the shore (no. 1028); Tagus Cove, common on lava beds at 4000 ft. (no. 1027). CHARLES ISL.: *Darwin.* CHATHAM ISL.: Wreck Bay, in swampy places, 1000-1750 ft., (no. 1029). JAMES ISL.: *Scouler.* NARBOROUGH ISL.: *Snodgrass and Heller.* Widely distributed.

C. brachystachys Anderss. (2), 53, t. 13, f. (2); Rob. (1), 126.—ABINGDON ISL.: occasional at 600 ft., common in open places in the vegetation at 1400 ft., (no. 1030). ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, common above 300 ft. (no. 1032); Villamil, *Baur.* CHARLES ISL.: occasional on rocks near the shore (no. 1033). CHATHAM ISL.: *Baur.* DUNCAN ISL.: common around 1300 ft. (no. 1034). JAMES ISL.: occasional on lava at 850 ft. (no. 1035). JERVIS ISL.: (no. 1036). TOWER ISL.: *Snodgrass and Heller.* Endemic.

C. confertus Sw. Prodr. 20 (1788); Rob. (1), 127.—ALBEMARLE ISL.: Iguana Cove, common to above 400 ft.; Tagus Cove, occasional on lava beds, 100-600 ft., (nos. 1038-1039); Villamil, occasional at 650 ft. (no. 1040). BINDLOE ISL.: *Snodgrass and Heller.* CHARLES ISL.: occasional at 1000-

1250 ft. (nos. 1042-1244). CHATHAM ISL.: Wreck Bay, on rocks at 500 ft. (no. 1041). DUNCAN ISL.: *Snodgrass and Heller.* HOOD ISL.: *Snodgrass and Heller.* INDEFATIGABLE ISL.: northwest side, *Andersson.* JAMES ISL.: *Andersson.* Widely distributed.

C. esculentus L. Sp. Pl. 45 (1753); Rob. (1), 127.—ALBEMARLE ISL.: Tagus Cove, occasional on rocky cliffs at 100 ft. (no. 1045). CHATHAM ISL.: Wreck Bay, occasional in sandy soil near the shore (no. 1046). Widely distributed.

C. galapagensis Caruel (1), 621; Rob. (1), 127.—CHATHAM ISL.: *Chierchia.* Endemic.

C. grandifolius Anderss. (1), 157, (2), 56; Rob. (1), 127. —CHARLES ISL.: occasional among rocks at 1550 ft. (no. 1047). CHATHAM ISL.: Wreck Bay, common in large bunches above 1800 ft. (no. 1048). Endemic.

C. laevigatus L. Mant. II. 179 (1771); Rob. (1), 127.—ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Villamil, occasional in brackish pools on the lower parts of the island (no. 1049). INDEFATIGABLE ISL.: southeast side, abundant in brackish pools near the shore (no. 1050). Further distr. tropical regions.

C. ligularis L. Amoen. Acad. V. 391 (1760); Rob. (1), 127. —ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, common in lava crevices near the shore and to some extent around 650 ft. (nos. 1051-1053). BINDLOE ISL.: (no. 1054). INDEFATIGABLE ISL.: Academy Bay, in pools of slightly brackish water near the shore (no. 1055). Further distr. W. Ind., tropical S. Am., Africa.

C. Mutisii (HBK.) Anderss. (2), 53. *Mariscus Mutisii* HBK. Nov. Gen. & Sp. I. 216, t. 66 (1815). *Cyperus Mutisii* Anderss. l. c.; Rob. (1), 128.—ABINGDON ISL.: abundant around steam jets at 1000 ft. (no. 1056). ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, abundant in open places in the vegetation above the cove (no. 1057); Tagus Cove, (nos. 1059-1061); Villamil, common in lava crevices on the lower parts and at 500 ft. BINDLOE ISL.: occasional in tufaceous soil on the lower parts (no. 1062). CHARLES ISL.: rare among rocks at 50 ft., common at 1450 ft., (no. 1063). CHATHAM ISL.: *Andersson; Baur.* GARDNER ISL. (near HOOD ISL.): (no. 1065). INDEFATIGABLE ISL.: Academy Bay, occasional at 100 ft. (no. 1067); southeast side, common at 450 ft. (no. 1066). NARBOROUGH ISL.: south and east sides, *Snodgrass and Heller;* north side, common on lava beds near the shore (no. 1068). SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* TOWER ISL.: dried remains, the specific identity of which is somewhat in doubt, (no. 1069). WENMAN ISL.: common on tops of the cliffs. Possibly this is the species of which *Mr. Heller* noticed dried remains on the islet north of Wenman, mentioned by Robinson (1), 251. Endemic.

C. polystachyus Roth. Desc. & Ic. 39, t. 11, f. 1 (1786). *C. fugax* Liebm. Mex. Halv. 8 (1850); Rob. (1), 127.—CHATHAM ISL.: Wreck Bay, *Baur.* Widely distributed.

C. rotundus Hook. f. (3), 177; Rob. (1), 128.—ALBEMARLE ISL.: *Macrae.* The specific identity of the *Macrae* specimen is somewhat in doubt. Endemic?

C. rubiginosus Hook. f. (3), 178; Rob. (1), 128.—CHARLES ISL.: *Darwin.* CHATHAM ISL.: Wreck Bay, abundant in moist places, 450-700 ft., (no. 1070). DUNCAN ISL.: abundant among rocks at 1000 ft. (no. 1071). Endemic.

Var. **cornutus** Rob. (1), 128. *Mariscus cornutus* Anderss. (1), 151. *C. cornutus* Anderss. (2), 53, t. 13, f. 1.—BARRINGTON ISL.: common around dried pools (no. 1074). CHARLES ISL.: *Andersson.* DUNCAN ISL.: *Snodgrass and Heller.* SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* Endemic.

C. strigosus L. Sp. Pl. 47 (1753); Rob. (1), 128.—CHARLES ISL.: *Darwin.* CHATHAM ISL.: *Andersson.* Further distr. U. S.

C. suranimensis Rottb. Descr. Nov. Pl. 35, t. 6, f. 5 (1786); Rob. (1), 129.—CHATHAM ISL.: Wreck Bay, in open grassy areas at 1750 ft. (no. 1075). JAMES ISL.: *Darwin.* Further distr. S. U. S., Mex., W. Ind., S. Am.

C. tristachyus Boeck. Linnaea XXXV. 454 (1867-1868); Rob. (1), 129.—CHATHAM ISL.: Wreck Bay, *Baur.* Further distr. Mex., northern S. Am.

C. sp.—BARRINGTON ISL.: dried remains of a *Cyperus* were found growing quite abundantly in coarse sandy soil in the vicinity of the shore. It seems to be different from any of the other species collected on the islands, (no. 1076).

C. sp. Rob. (1), 129.—NARBOROUGH ISL.: *Snodgrass and Heller.*

C. sp. Rob. (1), 129.—WENMAN ISL.: *Snodgrass and Heller.* Probably *C. Mutisii.*

Dichronema Michx.

D. colorata (L.) Hitchk. Baham, in Mo. Bot. Gard. IV. 141 (1893). *Schoenus coloratus* L. Sp. Pl. 41 (1753). *D. leucocephala* Michx. Fl. I. 37 (1803); Rob. (1), 129.—CHATHAM ISL.: Wreck Bay, covers the ground in dense mats in the open country around 650 ft. (no. 1077). Further distr. S. U. S., Mex., W. Ind., S. Am.

Eleocharis R. Br.

E. capitata (L.) R. Br. Prodr. 225 (1810). *Scirpus capitatus* L. Sp. Pl. 48 (1753).—ALBEMARLE ISL.: Villamil, occasional in rather loose dry soil on the south side of the rim of the crater at 3150 ft. (no. 1078). CHATHAM ISL.: Wreck Bay, abundant in marshy ground around 1700 ft. (no. 1079). Further distr. tropical regions.

E. fistulosa (Poir.) Schult. Mant. II. 89 (1824). *Scirpus fistulosa* Poir. Encycl. VI. 749 (1804). *E. fistulosa* Schult. l. c.; Rob. (1), 129.—CHATHAM ISL.: Wreck Bay, common in pools of water at 1000-1750 ft. (no. 1080). Widely distributed.

E. mutata (L.) R. Br. Prodr. 224 (1810). *Scirpus mutatus* L. Syst. ed. 10, 867 (1759). *E. mutata* R. Br. l. c.; Rob. (1), 129.—ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Villamil, abundant in brackish swamps and in other moist situations in the vicinity of the shore. The inhabitants of this island use the dried stalks of this species for making pads for pack-saddles, and sleeping mats, (no. 1081). Further distr. U. S., Mex., W. Ind., S. Am.

Fimbristylis Vahl

F. capillaris (L.) A. Gray, Man. Bot. ed. 5, 567 (1869). *Scirpus capillaris* L. Sp. Pl. 49 (1753). *F. capillaris* A. Gray, l. c.; Rob. (1), 129.—ALBEMARLE ISL.: Tagus Cove, abundant in lava crevices, 500-4000 ft., (nos. 1083-1084); Villamil, occasional in lava crevices on the floor of the crater at 2750 ft. (no. 1082). BINDLOE ISL.: *Snodgrass and Heller.* CHARLES ISL.: common among rocks near the shore (no. 1085). NARBOROUGH ISL.: Mangrove Point, *Snodgrass and Heller.* Widely distributed.

F. diphylla (Rtz.) Vahl, Enum. II. 289 (1805). *Scirpus diphyllus* Rtz. Obs. V. 7 (1789). *F. diphylla* Vahl, l. c.; Rob. (1), 129.—HOOD ISL.: *Snodgrass and Heller.* Widely distributed in tropical regions.

Hemicarpha Nees

H. micrantha (Vahl) Britton, Bull. Torr. Club. XV. 104 (1888). *Scirpus micranthus* Vahl. Enum. II. 254 (1805). *H. subsquarrosa* Nees, in Mart. Fl. Bras. II. pt. 1, 61 (1824); Rob. (1), 130.—CHATHAM ISL.: Wreck Bay, *Baur.* Further distr. U. S., Mex., W. Ind., S. Am.

Kyllinga Rottb.

K. pumila Michx. Fl. I. 28 (1803); Rob. (1), 130.—CHARLES ISL.: in moist shady places around 1000 ft. (nos. 1086-1087). CHATHAM ISL.: Wreck Bay, occasional in open country around 600 ft. (no. 1088). Further distr. Mex., W. Ind., S. Am.

Scleria Berg.

S. pterota Presl in Oken, Isis, XXI. 269 (1828). *S. pratensis* Lindl. ex Nees, Nov. Act. Nat. Cur. XIX. Suppl. I. 121 (1843); Rob. (1), 130.—CHATHAM ISL.: Wreck Bay, occasional patches at 650 ft. (no. 1089). Further distr. Mex., W. Ind., S. Am.

LEMNACEAE

Lemna L.

L. minor L. Sp. Pl. 970 (1753).—ALBEMARLE ISL.: Villamil, common in pools of slightly brackish water near sea level (no. 1100). CHATHAM ISL.: Wreck Bay, abundant on the surface of pools and streams, 1000-1800 ft., (no. 1101). Widely distributed.

L. sp., Wolf (1), 284.—CHARLES ISL.

BROMELIACEAE

Tillandsia L.

T. insularis Mez in DC. Monog. IX. 756 (1896); Rob. (1), 130.—ALBEMARLE ISL.: Tagus Cove, rare above 2500 ft. on the west side of the mountain; on the southeast side it often covers the ground in great profusion over considerable areas; Villamil, common on the branches of trees and on the ground in vegetable mold, 350-1300 ft. CHARLES ISL.: common on bushes, on small trees, among rocks in vegetable mold at 1400 ft. CHATHAM ISL.: Wreck Bay, among rocks in vegetable mold, and covering the branches of *Hippomane Mancinella* trees around 700 ft. DUNCAN ISL.: on rocks and in vegetable mold, 1150-1250 ft. INDEFATIGABLE ISL.: Academy Bay, on the branches of trees and in vegetable mold, 350-550 ft., (no. 1119); northwest side, occasional at 550 ft., abundant in the region around 700 ft., where it often forms large patches on the ground in places where the vegetation is not too dense for its growth. JAMES ISL.: James Bay, occasional on the sides of the bluffs, 1300-1500 ft. NARBOROUGH ISL.: south side, upper regions acc. to *R. H. Beck*. This is the only tank epiphyte found on the islands. Specimens often contain as much as a pint of water, from which they seem to obtain their entire supply of moisture during dry weather. The root system is so poorly developed that a slight push will uproot a specimen when found growing on the ground. Endemic.

COMMELINACEAE

Commelina Plum.

C. nudiflora L. Sp. Pl. 41 (1753); Rob. (1), 130.—ABINGDON ISL.: common in the upper regions (no. 1122). ALBE-

MARLE ISL.: Iguana Cove, common on the sides of the cliffs above the cove (no. 1124); Tagus Cove, occasional on lava beds at 1400 ft. (no. 1123). CHARLES ISL.: common at 1750 ft. (no. 1127). CHATHAM ISL.: Wreck Bay, common at 350-2100 ft. (nos. 1125-1126). DUNCAN ISL.: common on the sides of cliffs at 1250 ft. (no. 1128). INDEFATIGABLE ISL.: Academy Bay, abundant above 100 ft. (nos. 1130-1131); southeast side, occasional in open woods at 450 ft. (no. 1129). JAMES ISL.: *Darwin.* Further distr. general in tropics.

Commelinacea, Caruel (1), 621; Rob. (1), 131.—CHARLES ISL.: *Chierchia.* Same as the preceding, acc. to Rob. l. c.

IRIDACEAE

Iris L.

I. sp. ALBEMARLE ISL.: Villamil, a few sterile specimens of a small *Iris* were collected on the south rim of the crater at 3150 ft. (no. 1133).

CANNACEAE

Canna L.

C. sp. ALBEMARLE ISL.: Villamil, occasional at 700 ft. INDEFATIGABLE ISL.: Academy Bay, acc. to *J. S. Hunter.* JAMES ISL.: James Bay, occasional in woodland at 1500 ft. The specimens are all sterile.

AMARYLLIDACEAE

Furcraea Vent.

F. cubensis Vent. in Bull. Soc. Philom. I. 66 (1793).—ALBEMARLE ISL.: Villamil, around habitations. CHARLES ISL.: around former habitations (no. 1134). CHATHAM ISL.: Wreck Bay, formerly used as hedges around the plantation. INDEFATIGABLE ISL.: northwest side, occurs first at 450 ft. and extends to above 1000 ft. This species was introduced on this island many years ago by the tortoise hunters who planted it at their plantation above 1000 ft. *Capt. Thomas Levick,* of Chatham Isl., told us that on one of his trips to Indefatigable, a few years ago, he took some of the seed with him and scattered it along the trail as he came down the side of the mountain. From these seeds the plant has grown abundantly and now forms impenetrable thickets, many acres in extent, along the trail. The inhabitants of Chatham Isl. use the fiber of this plant for rope, of which it makes a very good quality. Widely distributed in tropical regions through cultivation. Probably introduced on the islands.

Hypoxis L.

H. decumbens L. Amoen. Acad. V. 396 (1759); Rob. (1), 131.—ALBEMARLE ISL.: Villamil, common in open woodland at 600 ft., rare at 1300 ft., (nos. 1135-1136). CHARLES ISL.; *Darwin*. CHATHAM ISL.: Wreck Bay, *Baur*. Further distr. Mex., W. Ind., S. Am.

H. sp.—ABINGDON ISL.: an *Hypoxis*, which is probably the last mentioned, occurs on this island. No specimens were taken.

ORCHIDACEAE

Epidendrum L.

E. spicatum Hook. f. (3), 180; Rob. (1), 131.—ABINGDON ISL.: on the trunks and branches of trees around 1900 ft. (no. 1137). ALBEMARLE ISL.: Villamil, abundant on the trunks and branches of trees, 1200-3150 ft., (no. 1138). CHARLES ISL.: *Lee*. JAMES ISL.: James Bay, on trees above 2100 ft. (no. 1139). Endemic.

Eulophia R. Br.

E. sp.—INDEFATIGABLE ISL.: Academy Bay, a sterile specimen of an Orchid, with foliage similar to an *Eulophia*, was found growing in vegetable mold in densely shaded places at 600 ft. Hemsley, Gard. Chron. 177 (1900), refers to an *Eulophia* from the Galapagos Ids. It is possible that the specimen Mr. Hemsley refers to and the one under consideration belong to the same species, (no. 1144).

Ionopsis HBK.

I. utricularioides (Sw.) Lindl. Coll. Bot. t. 39 A (1821-1825). *Epidendrum utricularioides* Sw. Prodr. 122 (1788). —ALBEMARLE ISL.: Villamil, common on the trunks and branches of trees, 300-700 ft., (no. 1141). CHARLES ISL.: fairly common on trees at 1300 ft. (no. 1142). DUNCAN ISL.: rare on bushes at 1250 ft. (no. 1144). INDEFATIGABLE ISL.: Academy Bay, on the branches of trees, 350-500 ft.; northwest side, occasional at 800 ft.; southeast side, common on bushes and trees above 450 ft. (no. 1145). JAMES ISL.: James Bay, occasional on the branches of trees at 1000 ft. It is not abundant and does not seem to extend above this elevation, (no. 1146). Further distr. W. Ind.

Ponthieva R. Br.

P. maculata Lindl. in Ann. & Mag. Nat. Hist. I. XV. 385 (1845).—JAMES ISL.: James Bay, rare on the branches of trees in the upper moist regions. Specimen collected by *Mr. R. H. Beck,* identified by the late Mr. A. A. Eaton, (no. 1147). Further distr. Mex., northern S. Am.

DICOTYLEDONEAE

PIPERACEAE

Peperomia R. & P.

P. flagelliformis Hook. f. ex. Miq. in Hook. Lond. Jour. Bot. IV. 423 (1845), and (3), 181; Rob. (1), 131.—JAMES ISL.: *Darwin.* Endemic.

P. galapagensis Hook. f. ex. Miq. in Hook. Lond. Jour. Bot. IV. 426 (1845), and (3), 180; Rob. (1), 131.—ABINGDON ISL.: occasional on trees at 1500 ft. (no. 1153). ALBEMARLE ISL.: Villamil, common on the branches of trees above 400 ft. (no. 1158). DUNCAN ISL.: on rocks and bushes at 1275 ft. (no. 1149). INDEFATIGABLE ISL.: Academy Bay, on rocks and trees above 350 ft. (no. 1152); southeast side, on trees and bushes at 625 ft. (no. 1151). JAMES ISL.: James Bay, on the branches of trees above 1300 ft. (no. 1150). Specimens determined by Mr. Casimir de Candolle. Endemic.

P. galioides HBK. Nov. Gen. & Sp. I. 71, t. 17 (1815); Rob. (1), 131.—ABINGDON ISL.: common in woodland at 1650 ft. (no. 1154). ALBEMARLE ISL.: Villamil, occasional in vegetable mold among rocks, 1300-1500 ft., (no. 1156). CHATHAM

Isl.: Wreck Bay, on rocks, 650-700 ft., (no. 1158). Indefatigable Isl.: Academy Bay, occasional in vegetable mold among rocks in open woodland at 400 ft. (no. 1159); northwest side, common above 500 ft. (no. 1155). The specimens from Albemarle and Indefatigable Ids. were determined by Mr. Casimir de Candolle. Further distr. Mex., S. Am.

P. obtusilimba C. DC. nov. sp.

Foliis ternis-quaternis breviter petiolatis subovato-ellipticis basi et apice rotundatis utrinque glabris superne minutissime in margine ciliatis, 5-nerviis, nerviis tenuissimis; nervulo marginali obscuro ab apice fere usque ad medium decurrente; petiolo margine minute ciliatis; spicis axillaribus terminalibusque, pedunculis minutissime puberulis petiolos superantibus; spicis ipsis limbos multo vel pluries superantibus filiformibus sublaxifloris, bractea orbiculari centro subsessili; ovario obovato emerso fere in apice stigmatifero, stigmate minuto glabro; bacca subovato-globosa glandulis asperulata. Caulis ½ mm. crassus minutissime puberulus. Limbi in sicco membranaceis rufescentes epunctati, usque ad 10 mm. longi et 5 mm. lati. Petioli 1½ mm. longi. Pedunculis usque ad 6 mm. longi. Spicae terminales 5 cm. axillares 2½ cm. longae, ½ mm. crassae. Bractea diametro ½ mm. brevior. Bacca ½ mm. paululo longior.

Charles Isl.: common on rocks and low bushes at 1400 ft. (nos. 1160-1161). Endemic.

P. petiolata Hook. f. (3), 181; Rob. (1), 131.—James Isl.: *Darwin*. Endemic.

P. ramulosa Anderss. (1), 158, and (2), 57; Rob. (1), 131. —Charles Isl.: common in decayed moss on the branches of trees at 1700 ft. (no. 1162). Endemic.

P. Snodgrassii C. DC. in Rob. (1), 131.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller*. Endemic.

P. Stewartii C. DC. nov. sp.

Foliis sat longe petiolatis oblongo-ovatis basi acutis apice subacutis, utrinque glabris superne margine ciliolatis, 6-nerviis, nerviis tenuissimis; petiolo margine crispulo-hirtello; pedunculis terminalibus glabris petiolos fere aequantibus; spicis folia pluries superantibus sub densifloris; bractea obovata supra centrum longiuscule pedicellata; antheris rotundatis quam filamenta multo brevioribus; ovario emerso ovato apice obtuso, stigmate puberulo; bacca ovata glandulis globosis asperata.

Caulis crispulo-hirtellus filiformis fere ¾ mm. crassus. Folia alterna, internodia 6-7 mm. longa. Limbi in sicco membranacei, superi 15-18 mm. longi et 8-9 mm. lati, inferi magis ovati. Petioli circiter 6 mm. longi. Spicae circiter 5 cm. longae et 1 mm. crassae. Bracteae infimae orbiculares, aliae ut in diagnosi. Ovarium paullo sub apice stigmatiferum. Bacca 1 mm. longa, sessilis.

ABINGDON ISL.: common on rocks at 1050 ft. (no. 1163). ALBEMARLE ISL.: Villamil, common among rocks in woodland, 350-1500 ft., (nos. 1164-1165). CHARLES ISL.: in moist shady places at 1000 ft. (no. 1166). INDEFATIGABLE ISL.: Academy Bay, in shady places, 50-400 ft., (no. 1168, Type); northwest side, common in shade at 950 ft. (no. 1170). JAMES ISL.: James Bay, in woodland at 850 ft., not common, (no. 1171). This is one of the most common species of *Peperomia* found on the islands and is usually the first species to be seen in ascending the sides of the mountains. Endemic.

P. n. sp. Rob. (1), 132.—ALBEMARLE ISL.: Tagus Cove, *Snodgrass and Heller.* Endemic.

P. sp. Rob. & Greenm. (1), 148.—CHATHAM ISL.: *Baur.*

URTICACEAE

Fleurya Gaud.

F. aestuans Gaud. in Freyc. Voy. Bot. 497 (1826); Rob. (1), 132.—ABINGDON ISL.: common, 800-1100 ft., (no. 1172). ALBEMARLE ISL.: Iguana Cove, abundant from the beach to 600 ft. (no. 1325); Tagus Cove, common in lava crevices in shade, 300-2900 ft., (no. 1177); Villamil, abundant among rocks, 300-1300 ft., (nos. 1174-1175). CHARLES ISL.: occasional among rocks at 1550 ft. (no. 1326). CHATHAM ISL.: Basso Point, occasional in shady places at 900 ft. (no. 1327). DUNCAN ISL.: common on the sides of steep lava cliffs at 1000 ft., also common around 1250 ft., (no. 1328). HOOD ISL.: occasional in lava crevices, 400-600 ft., (no. 1329). INDEFATIGABLE ISL.: Academy Bay, occasional among rocks at 50 ft. At this elevation the specimens are low and with many stinging hairs on the stem. This same species also grows very abundantly around 600 ft., where it attains a height of 3-4 ft. and has fewer stinging hairs on both the stems and leaves than do the specimens taken from the lower elevations, (nos. 1130-1331). JAMES ISL.: James Bay, *Snodgrass and Heller.* NARBOROUGH ISL.: south side, *Snodgrass and Heller.* This species shows much variation both in size and in the arming of the stem and leaves, but the differences are not sufficient to be of formal value. Further distr. Mex., W. Ind., S. Am.

Parietaria L.

P. debilis G. Forst. Fl. Ins. Aust. Prodr. 73 (1786); Rob. (1), 132.—ALBEMARLE ISL.: Iguana Cove, in protected places on the sides of the cliffs above the cove (no. 1334); Tagus Cove, occasional at 1000 ft., common in lava crevices at 2850 ft., (no. 1333); Villamil, common among rocks at 550 ft. (no. 1332). CHARLES ISL.: in shady places among rocks at 1550 ft. (no. 1335). JAMES ISL.: *Darwin.* Widely distributed in tropical regions.

Pilea Lindl.

P. Baurii Rob. (1), 133.—ABINGDON ISL.: common in moist shady places around 1650 ft. (no. 1336). CHARLES ISL.: *Baur.* CHATHAM ISL.: Wreck Bay, common in open country around 1000 ft. (no. 1338). JAMES ISL.: James Bay, occasional around 2000 ft. (no. 1339). There is much variation in the specimens found growing in sun and in shade, those growing in the shade having a green stem, thinner leaves, and a much less branched inflorescence. Endemic.

P. microphylla (L.) Liebm. in Vidensk. Selk. Skr. ser. 5, II. 296 (1851). *Parietaria microphylla* L. Sp. Pl. ed. 2, 1492 (1763). *Pilea muscosa* Lindl. Coll. Bot. t. 4 (1821); Rob. (1), 133.—JAMES ISL.: *Darwin.* Further distr. Mex., W. Ind., S. Am.

P. peploides (Gaud.) Hook & Arn. Bot. Beech. 96 (1832). *Dubreulia peploides* Gaud. in Freyc. Voy. Bot. 495 (1826). *P. peploides* Hook & Arn. l. c.; Rob. (1), 133.—ALBEMARLE ISL.: Tagus Cove, in lava crevices at 2850 ft. (no. 1340). CHARLES ISL.: common on moist rocks at 1000 ft., occasional at 1550 ft., (nos. 1339, 1341). CHATHAM ISL.: Wreck Bay, rare in shady places at 700 ft. (no. 1342). JAMES ISL.: *Darwin.* Further distr. Pacific Ids., Asia.

Urera Gaud.

U. alceaefolia (Poir.) Gaud. in Freyc. Voy. Bot. 497 (1826). *Urtica alceaefolia* Poir. Suppl. 227 (1816).—ALBEMARLE ISL.: Villamil, common bushes, 650-1500 ft. The leaves of many of the specimens are variegated, (no. 1343). INDEFATIGABLE ISL.: Academy Bay, common bushes above

500 ft. They increase in size and abundance above this elevation, according to *Mr. F. X. Williams,* of the Academy's expedition, (no. 1344). JAMES ISL.: James Bay, occasional bushes in open woodland around 2000 ft. (no. 1345). Further distr. Mex., S. Am.

LORANTHACEAE

Phoradendron Nutt.

P. florianum (Anderss.) Rob. (1), 133. *Viscum florianum* Anderss. (1), 219, (2), 92.—CHARLES ISL.: *Andersson.* Endemic.

P. galapageium (Hook. f.) Rob. (1), 133. *Viscum galapageium* Hook. f. (3), 216.—CHATHAM ISL.: *Darwin; Andersson.* Endemic.

P. Henslovii (Hook. f.) Rob. (1), 133. *Viscum Henslovii* Hook. f. (3), 216.—ABINGDON ISL.: common on trees and bushes, 450-1000 ft., (no. 1102). ALBEMARLE ISL.: Cape Rose, on trees near the shore (no. 1103); Cowley Bay, on trees and bushes above 400 ft. (no. 1106); Iguana Cove, common on trees above 300 ft. (no. 1104); Tagus Cove, on trees and bushes, 400-4000 ft.; Villamil, common on bushes near the shore. It also occurs throughout the wooded regions to 1500 ft. and is present on small trees and bushes on the rim of the crater at 3150 ft., as well as on trees of *Zanthoxylum Fagara* on the floor of the same at 2750 ft., (no. 1105). CHARLES ISL.: common on bushes of *Lipochaeta laricifolia,* 600-1000 ft., also common on trees of *Zanthoxylum Fagara* and *Scalesia pedunculata* at 1100 ft., (no. 1108). CHATHAM ISL.: Basso Point, occasional on trees at 900 ft. (no. 1107); Sappho Cove, on trees and bushes near the shore; Wreck Bay, *Baur.* DUNCAN ISL.: occasional on bushes at 1250 ft. (no. 1109). INDEFATIGABLE ISL.: Academy Bay, abundant on trees and bushes near the shore. It increases in size and abundance with the elevation above sea level, (no. 1102); southeast side, common on trees and bushes above 400 ft.; northwest side, abundant above 700 ft. JAMES ISL.: James Bay, abundant on bushes to 2500 ft.; northeast side, on trees and bushes above 100 ft. JERVIS ISL.: occasional on bushes above 700 ft. This species varies greatly in size at different elevations. Specimens from the moist region are usually much larger than those found in the dry and transition regions. Endemic.

P. uncinatum Rob. (1), 134.—NARBOROUGH ISL.: *Snodgrass and Heller.* Endemic.

POLYGONACEAE

Polygonum L.

P. acre HBK. Nov. Gen. & Sp. II. 179 (1817).—CHATHAM ISL.: Wreck Bay, common in pools of water at 1000 ft. (no. 1121). Further distr. U. S., Mex., W. Ind., S. Am.

P. acuminatum HBK. Nov. Gen. & Sp. II. 178 (1817); Rob. (1), 134.—GALAPAGOS IDS.: according to Griesb. Fl. W. Ind. 161. It is probable that the next species has been mistaken for this one, as the two resemble each other rather closely. Further distr. Mex., W. Ind., S. Am.

P. galapagense Caruel (1), 624; Rob. (1), 134.—ALBEMARLE ISL.: Villamil, occasional above 2500 ft. CHATHAM ISL.: Wreck Bay, common in large bunches 2-4 ft. high in the open grassy country above 1700 ft. (no. 1120). Endemic.

CHENOPODIACEAE

Atriplex L.

A. sp. Rob. (1), 134.—INDEFATIGABLE ISL.: north side, low shrubs on sand beaches (no. 1346). SEYMOUR ISL., NORTH: *Snodgrass and Heller.* All of the specimens are sterile and indeterminate as to species.

A. sp. Rob. (1), 134.—WENMAN ISL.: *Snodgrass and Heller.*

Salicornia L.

S. sp. (?).—JAMES ISL.: northeast side, a plant resembling a *Salicornia* in habit and inflorescence was seen growing on the shores of salt lagoons. No specimens were secured.

AMARANTACEAE

Alternanthera Forsk.

A. radicata Hook. f. (4), 261, 262; Rob. (1), 134.—CHATHAM ISL.: *Darwin.* CHARLES ISL.: abundant in barren places among lava boulders near the shore (no. 1347). HOOD ISL.: *Snodgrass and Heller.* Endemic.

A. rigida Rob. & Greenm. (1), 143, 148; Rob. (1), 135.—JAMES ISL.: northeast side, occasional bushes 6-10 inches high on lava beds near the shore, and to some extent at 700 ft., (no. 1348). Endemic.

A. subscaposa Hook. f. (3), 189; Rob. (1), 135.—CHARLES ISL.: *Darwin.* DUNCAN ISL.: rare in moist protected places around 1250 ft. (no. 1349). Endemic.

Amaranthus L.

A. caracasanus HBK. Nov. Gen. & Sp. II. 195 (1817); Rob. (1), 135.—ALBEMARLE ISL.: Iguana Cove, rare on the sides of the cliffs above the cove (no. 1351); Tagus Cove, *Snodgrass and Heller;* Villamil, fairly common in open places on the lower parts (no. 1350). CHARLES ISL.: abundant from the beach to 1000 ft. during the rainy season (no. 1354). CHATHAM ISL.: Wreck Bay, abundant near the shore (no. 1356). INDEFATIGABLE ISL.: northwest side, *Andersson.* One of the common spring weeds of the islands where it occurs. Further distr. northern S. Am.

A. celosioides HBK. Nov. Gen. & Sp. II. 194 (1817); Rob. (1), 135.—CHARLES ISL.: *Darwin; Andersson.* CHATHAM ISL.: *Andersson.* Further distr. northern S. Am.

A. sclerantoides Anderss. (2), 59, t. 2, f. 1; Rob. (1), 135. —BARRINGTON ISL.: *Snodgrass and Heller.* CHARLES ISL.: common in open sunny places at 450 ft. (no. 1357). CHATHAM ISL.: Wreck Bay, common near the shore (no. 1358). NARBOROUGH ISL.: east side, *Snodgrass and Heller.* Endemic.

Forma **abingdonensis** nov. forma.

Ramulis diffusis; foliis linearibus late patentibus circa 2.5 cm. longis, ad apicem 1 mm. latis.

ABINGDON ISL.: occasional among rocks at 700 ft. (no. 1359). Plate II, fig. 1. Endemic.

Forma **albemarlensis** nov. forma.

Foliis subappressis ad apices dilatis 1.9 cm. longis, 5 mm. latis.

ALBEMARLE ISL.: Turtle Cove, common on sand beaches, (no. 1360). Plate II, fig. 2. Endemic.

Forma **chathamensis** Rob. & Greenm. (1), 140; Rob. (1), 135.—CHATHAM ISL.: Wreck Bay, *Baur*. Endemic.

Forma **hoodensis** Rob. & Greenm. (1), 140; Rob. (1), 135.—GARDNER ISL. (near HOOD ISL.): common on sand beaches (no. 1361). HOOD ISL.: *Baur; Snodgrass and Heller*. Endemic.

A. spinosus L. Sp. Pl. 991 (1753); Rob. (1), 135.—CHARLES ISL.: *Andersson*. Of wide distribution.

A. squamulatus (Anderss.) Rob. Proc. Am. Acad. XLIII. 22 (1907). *Scleropus squamulatus* Anderss. (1), 162, (2), 60. *A. squarrulosus* Uline & Bray, Bot. Gaz. XIX. 270 (1894); Rob. (1), 135.—ALBEMARLE ISL.: Cowley Bay, occasional at 2000 ft. (no. 1363); Tagus Cove, occasional in tufaceous soil at 100 ft. (no. 1362). CHARLES ISL.: *Snodgrass and Heller*. CHATHAM ISL.: *Andersson*. DUNCAN ISL.: *Snodgrass and Heller*. INDEFATIGABLE ISL.: Academy Bay, (no. 1364); north side, *Snodgrass and Heller;* northeast side, fairly abundant in loose ashy soil near the shore (no. 1365). JAMES ISL.: James Bay, fairly common in rocky soil on the lower parts (no. 1356). JERVIS ISL.: *Baur*. SEYMOUR ISL., NORTH: *Snodgrass and Heller*. Endemic.

A. urceolatus Benth. Bot. Sulph. 158 (1844); Rob. (1), 136.—INDEFATIGABLE ISL.: *Andersson*. Further distr. adjacent S. Am. from Peru northward. Lower California acc. to Rob. l. c.

A. viridis L. Sp. Pl. ed. 2, 1405 (1763); Rob. (1), 136.—ALBEMARLE ISL.: Villamil, occasional to 650 ft., abundant at 1300 ft., (nos. 1357-1359). BARRINGTON ISL.: *Snodgrass and Heller*. CHATHAM ISL.: Wreck Bay, abundant in sandy soil near the shore and in clay soil in open sunny places at 50 ft. (nos. 1360-1361). Further distr. general in warm countries.

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Froelichia Moench.

F. juncea Rob. & Greenm. (1), 143, 148; Rob. (1), 136.—Albemarle Isl.: Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, in dense somewhat prostrate clumps on lava beds near sea level (no. 1362). Indefatigable Isl.: southeast side, low bushes at 450 ft. (no. 1363). Endemic.

F. lanigera Anderss. (2), 63; Rob. (1), 136. *F. lanata* Anderss. (2), t. 3, f. 1.—Albemarle Isl.: Cowley Bay, prostrate bushes in pumice soil near the shore (no. 1364); Tagus Cove, abundant on the sides and top of the mountain at 4000 ft. (no. 1365). Duncan Isl.: low bushes on the sides and top of the island (no. 1366). Narborough Isl.: north side, low bushes on recent lava. Endemic.

F. nudicaulis Hook. f. (3), 192; Rob. (1), 136.—Charles Isl.: *Darwin; Andersson.* Chatham Isl.: *Andersson.* Endemic.

F. scoparia Rob. (1), 136.—James Isl.: James Bay, common bushes on the lower parts (no. 1367). Narborough Isl.: south side, *Snodgrass and Heller.* Endemic.

Iresine L.

I. Edmonstonei Hook. f. (3), 190; Rob. (1), 137.—Charles Isl.: *Darwin.* Endemic.

Pleuropetalum Hook. f.

P. Darwinii Hook. f. (1), t. 2, (3), 221; Rob. (1), 137.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller;* Villamil, occasional bushes 2-3 ft. high in woodland at 400-700 ft. (no. 1358). James Isl.: James Bay, common bushes in woodland above 1500 ft. (nos. 1369-1370). Endemic.

Telanthera R. Br.

T. echinocephala (Hook. f.) Moq.-Tand in DC. Prodr. XIII. pt. 2, 373 (1849). *Brandesia echinocephala* Hook. f. (3), 189. *T. echinocephala* Moq.-Tand. l. c.; Rob. (1), 137.—Abingdon Isl.: common in thickets of *Laguncularia race-*

mosa near the shore, common bushes at 1000 ft. The specimens taken from the vicinity of the shore have much smaller leaves than do those taken at 1000 ft., (nos. 1371-1372). ALBEMARLE ISL.: Cowley Bay, common bushes at 2100 ft. (no. 1376); Iguana Cove, bushes 3-4 ft. high, all over the lower parts, (no. 1374); Villamil, common bushes to 600 ft. (no. 1375). BARRINGTON ISL.: *Snodgrass and Heller.* CHARLES ISL.: *Darwin; A. Agassiz; Andersson; Snodgrass and Heller.* CHATHAM ISL.: Wreck Bay, occasional bushes 4-5 ft. high to 250 ft. (no. 1377). DUNCAN ISL.: *A. Agassiz; Baur; Snodgrass and Heller.* GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: common bushes (nos. 1378-1380). INDEFATIGABLE ISL.: Academy Bay, common bushes 5-6 ft. high in the vicinity of the shore, occasional to 300 ft., (no. 1381); north side, *Snodgrass and Heller;* southeast side, common bushes on the lower parts (no. 1382). JAMES ISL.: James Bay, common bushes to above 1000 ft. (nos. 1383-1384). Endemic.

T. filifolia (Hook. f.) Moq.-Tand. in DC. Prodr. XIII. pt. 2, 368 (1849). *Bucholtzia filifolia* Hook. f. (3), 192. *T. filifolia* Moq.-Tand. l. c.; Rob. (1), 138.—JAMES ISL.: *Scouler.* Endemic.

T. flavicoma Anderss. (1), 166, (2), 61, t. 5, f. 2; Rob. (1), 138.—ABINGDON ISL.: prostrate bushes, common, 900-1400 ft., (nos. 1386-1387). ALBEMARLE ISL.: Cowley Bay, occasional bushes at 2000 ft. (no. 1393); Villamil, species in doubt (no. 1392). CHARLES ISL.: *Andersson.* CHATHAM ISL.: Basso Point, low bushes in open places at 875 ft. (no. 1388); Sappho Cove, occasional on lava flows and in the vicinity of the coast (no. 1389); Wreck Bay, low bushes near the beach (no. 1390). GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: abundant in crevices of the lava (no. 1391). INDEFATIGABLE ISL.: Academy Bay, occasional low bushes near the beach and in the interior to 100 ft. (nos. 1394-1395). JAMES ISL.: James Bay, occasional bushes 12-18 inches high to 2150 ft. (nos. 1396-1397). Endemic.

T. galapagensis nov. sp.

Suffrutescens circa 2.5 dm. alta; ramis oppositis vel alternis teretibus striatis glaucescentibus ad nodos lanuginoso-ciliatis; foliis oppositis 1.2-2.8 cm. longis, 0.6-1.3 cm. latis, oblanceolatis apice obtusis basi cuneatis sessilibus vel brevi-petiolatis integerrimis glaberrimis glaucescentibus; spicis densifloris 3-9 mm. longis terminalibus et axillaribus sessilibus; bracteis ovatis carinatis acutis hispidis; sepalis exterioribus lanceolatis plerumque 3-costatis bruneis hispidis apice subflavis; sepalis interioribus lineari-lanceolatis acutis carinatis margine hyalinis; staminodiis ad apices laciniatis elongatis.

This species is closely related to *T. Snodgrassii* Rob. but differs in the glabrous glaucous character of the leaves and in the smaller size of the spikes. GARDNER ISL. (near CHARLES ISL.): (no. 1403). *J. R. Slevin,* collector. Plate II, figs. 3-4. Endemic.

T. glaucescens (Hook. f.) Moq.-Tand. in DC. Prodr. XIII. pt. 2, 369 (1849). *Bucholtzia glaucescens* Hook. f. (3), 191. *T. glaucescens* Moq.-Tand. l. c.; Rob. (1), 138.—CHARLES ISL.: *Andersson.* CHATHAM ISL.: *Darwin; Andersson.* Endemic.

T. halimifolia (Lam.) n. comb. *Achyranthes halimifolia* Lam. Dict. I. 547 (1783). *T. frutescens* Moq.-Tand. in DC. Prodr. XIII. pt. 2, 365 (1849); Rob. (1), 138.—ALBEMARLE ISL.: Villamil, common in moist places in the upper regions, especially in open woodland around 1300 ft., (no. 1398). CHATHAM ISL.: Wreck Bay, common in woodland above 200 ft. (no. 1399). INDEFATIGABLE ISL.: Academy Bay, small specimens of this species occur at 300 ft., but at 600 ft. the specimens are larger and more abundant, (no. 1401); northwest side, common at 400 ft. (no. 1400); southeast side, abundant in shady places at 625 ft. (no. 1402). Further distr. S. Am.

T. Helleri Rob. (1), 138.—CULPEPPER ISL.: low bushes among rocks near the shore (no. 1404). *F. X. Williams,* collector. Endemic.

Var. **obtusior** Rob. (1), 139.—WENMAN ISL.: common bushes, 2-3 ft. high, (no. 1424).

T. nudicaulis (Hook. f.) Moq.-Tand. in DC. Prodr. XIII. pt. 2, 369 (1849). *Bucholtzia nudicaulis* Hook. f. (3), 191. *T. nudicaulis* Moq.-Tand. l. c.; Rob. (1), 139.—ABINGDON ISL.: common bushes on the lower parts (no. 1405). ALBEMARLE ISL.: Cowley Bay, *Baur;* Tagus Cove, common bushes at 4000 ft. (no. 1407); Villamil, low and somewhat prostrate bushes (no. 1406). BRATTLE ISL.: (no. 1408). CHARLES

Isl.: common bushes (no. 1409). Chatham Isl.: north side, *Baur*. Duncan Isl.: *Snodgrass and Heller*. Hood Isl.: species in doubt (no. 1411). Indefatigable Isl.: northeast side, occasional low shrubs (no. 1410). Jervis Isl.: occasional low bushes at 1050 ft. (no. 1412). James Isl.: James Bay, fairly abundant to 1200 ft. (no. 1413); Orchilla Bay, *Baur*. Further distr. S. Chili.

T. rugulosa Rob. (1), 139.—Chatham Isl.: Wreck Bay, occasional low trees 10-12 ft. high around 1800 ft. (no. 1414). Endemic.

T. Snodgrassii Rob. (1), 140.—Albemarle Isl.: Villamil, low bushes, fairly common at 550 ft., (no. 1415). James Isl.: James Bay, (no. 1416). Seymour Isl., north: *Snodgrass and Heller*. Endemic.

T. strictiuscula Anderss. (1), 166; Rob. (1), 140.—Albemarle Isl.: Iguana Cove, common bushes near the shore (no. 1418); Villamil, low bushes at 550 ft. (no. 1417). Charles Isl.: bushes 2-3 ft. high among rocks at 1400 ft. (no. 1420). Chatham Isl.: Wreck Bay, common bushes 3-6 ft. high at 500 ft. (no. 1419). Indefatigable Isl.: southeast side, low bushes at 600 ft. (no. 1421). Narborough Isl.: south side, *Snodgrass and Heller*. Endemic.

T. vestita Anderss. (1), 169, (2), 63, t. 4, f. 1; Rob. (1), 140.—Indefatigable Isl.: Academy Bay, common bushes on the lower parts (no. 1423); north side, common in lava crevices (no. 1422). Endemic.

BATIDACEAE

Batis L.

B. maritima L. Syst Nat. ed. 10, 1376 (1760); Rob. (1), 141.—Charles Isl.: common on sand beaches (no. 1425). Chatham Isl.: Sappho Cove, common near the shore (no. 1426). Indefatigable Isl.: north side, common on sand beaches (no. 1427); southeast side, common on sand beaches (no. 1428). James Isl.: James Bay, common around salt lagoons and around the borders of a crater lake south of the bay (no. 1430). Widely distributed on tropical shores.

BASELLACEAE

Boussingaultia HBK.

B. baselloides HBK. Nov. Gen. & Sp. VII. 196, t. 645 (1825); Rob. (1), 141.—CHARLES ISL.: *Darwin.* DUNCAN ISL.: trailing vines covering rocks at 1150 ft. (no. 1431). Further distr. Mex., W. Ind., S. Am.

PHYTOLACCACEAE

Phytolacca L.

P. octandra L. Sp. Pl. ed. 2, 631 (1762). *P. decandra* Hook. f. (3), 193, not L.; Anderss. (1), 227, (2), 97; Rob. (1), 141.—ALBEMARLE ISL.: Villamil, prostrate bushes, common around 3150 ft., (no. 1433). JAMES ISL.: James Bay, common bushes 4-5 ft. high above 2150 ft. (no. 1432). Robinson, l. c., suggested that this species might possibly be *P. octandra.* The specimens secured confirm this suggestion. Further distr. Mex., W. Ind., S. Am.

Rivina Plum.

R. humilis L. Sp. Pl. 121 (1753).—ALBEMARLE ISL.: Villamil, low bushes in dense woodland at 500 ft. (no. 1434). INDEFATIGABLE ISL.: Academy Bay, rare near sea level, common in dense woodland at 300-450 ft., (nos. 1435-1436). JAMES ISL.: James Bay, fairly abundant in woodland around 2100 ft. (no. 1437). Further distr. S. U. S., Mex., W. Ind., S. Am.

NYCTAGINACEAE

Boerhaavia L.

B. erecta L. Sp. Pl. 3 (1753); Rob. (1), 141.—ALBEMARLE ISL.: *Macrae.* CHARLES ISL.: common to 600 ft. during the spring months; during the autumn it was found occasionally among rocks at 1450 ft., (no. 1438). CHATHAM ISL.: *Andersson.* INDEFATIGABLE ISL.: *Andersson.* Further distr. S. U. S., Mex., W. Ind., S. Am.

B. paniculata Rich. Act. Soc. Nat. Hist. Par. I. 105 (1792); Rob. (1), 141.—ALBEMARLE ISL.: Tagus Cove, common in open sunny places in tufaceous soil on the lower parts (no. 1440). James Isl.: *Darwin*. Narborough Isl.: north side, occasional in lava crevices (no. 1441). Further distr. S. U. S., Mex., S. Am.

B. scandens L. Sp. Pl. 3 (1753); Rob. (1), 141.—Albemarle Isl.: Iguana Cove, abundant near the shore (no. 1443); Villamil, abundant in open places on the lower parts of the island (no. 1442). Charles Isl.: common in open grassy places around 1000 ft. (no. 1444). Chatham Isl.: *Andersson; Snodgrass and Heller*. Duncan Isl.: occasional among bushes at 1150 ft. (no. 1466). Indefatigable Isl.: northwest side, common to 800 ft., very abundant in woodland around 650 ft., where it often forms the principal undergrowth, (no. 1445); southeast side, fairly common at 600 ft. (no. 1446). James Isl.: James Bay, common in open woods at 850 ft. (no. 1447). Further distr. S. U. S., Mex., W. Ind., S. Am.

B. viscosa Lag. & Rod. Anal. Cienc. Nat. IV. 256 (1801); Rob. (1), 142.—Abingdon Isl.: common on lava beds near the shore (no. 1448). Albemarle Isl.: Tagus Cove, common in open sunny places in tufaceous soil to 1000 ft. (no. 1449); Villamil, abundant in light ashy soil and on lava beds on the lower parts (no. 1450). Brattle Isl.: (no. 1455). Charles Isl.: common in tufaceous soil to 650 ft. (no. 1451). Chatham Isl.: Basso Point, common on sand beaches (no. 1454). Gardner Isl. (near Hood Isl.): *Snodgrass and Heller*. Hood Isl.: common on hillsides at 250 ft. (no. 1456). Indefatigable Isl.: north side, *Snodgrass and Heller;* southeast side, common in tufaceous soil at 600 ft. (no. 1458). James Isl.: James Bay, *Snodgrass and Heller*. A species which is rather characteristic of open sunny places in the dry region. Further distr. S. W. U. S., Mex., W. Ind., S. Am.

Cryptocarpus HBK.

C. pyriformis HBK. Nov. Gen. & Sp. II. 188, t. 124 (1817); Rob. (1), 142.—Abingdon Isl.: forming low thickets on sand beaches (no. 1458). Albemarle Isl.: Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, in dense thickets near the shore; Tagus Cove, *Snodgrass and Heller;* Turtle Cove, covering large areas with a dense growth of low bushes in the vicinity of the shore; Villamil, common on sand beaches and to some extent in the interior around brackish water pools (no. 1459). Barrington Isl.: forming low thickets on sand beaches (no. 1462). Bindloe Isl.: *Snodgrass and Heller.* Occasional thickets of this species were noticed at various places along the north shore. Charles Isl.: bushes 3-6 ft. high, forming tangled thickets on sand beaches, (no. 1460). Chatham Isl.: Basso Point, on sand beaches and on lava flows in the interior; Sappho Cove, bushes on the beach and in the interior (no. 1461); Wreck Bay, fairly common near the shore. Duncan Isl.: bushes near the shore. Gardner Isl. (near Hood Isl.): low bushes on the beach. Hood Isl.: very abundant in dense low thickets on sand beaches, and to some extent in the interior at 600 ft., (no. 1463). Indefatigable Isl.: Academy Bay, common on the beach and occasional at various places in the lower dry region; north side, low bushes on the beach; southeast side, common in thickets among rocks and in sand (no. 1465). It was also noticed in various other places on the shore, while the "Academy" was sailing around the island. James Isl.: James Bay, common bushes on the beach and around the shores of salt water lagoons (no. 1456). Jervis Isl.: low bushes on the beach. Narborough Isl.: east side, *Snodgrass and Heller.* Seymour Isl., south: occasional on the beach and in thickets of *Discaria pauciflora* and *Maytenus obovata* bushes. Further distr. Ecuador, Bolivia.

Mirabilis L.

M. Jalapa L. Sp. Pl. 177 (1753).—Albemarle Isl.: Villamil, in gardens, and undoubtedly introduced, (no. 1459).

Pisonia L.

P. floribunda Hook. f. (3), 193; Rob. (1), 143.—Abingdon Isl.: common trees, 450-1650 ft., (no. 1460). Albemarle Isl.: Cowley Bay, common trees above 1300 ft.; Iguana Cove, *Snodgrass and Heller;* Tagus Cove, forest trees above 1500 ft.; Villamil, large trees, 100-900 ft. Charles Isl.: trees 10-30 ft. high, occasional around 1000 ft., (no. 1461). Duncan Isl.: low trees and bushes around 1150 ft.

(no. 1463). INDEFATIGABLE ISL.: Academy Bay, small trees near the shore, one of the common forest trees above 350 ft., (no. 1463); north side, trees above 1000 ft.; northwest side, small trees at 150 ft., forming large forest trees at 500-800 ft. JAMES ISL.: James Bay, common trees, 450-1700 ft., (nos. 1464-1465); northeast side, trees above 600 ft. This species forms one of the most common forest trees in the transition and moist regions on the islands where it occurs. Hooker, op. c. 194, describes it as an almost leafless tree, but we found it to be usually covered with a dense growth of leaves. As a rule the trunk is short and the branches are large and broadly spreading. Owing to the rough nature of the bark it is usually covered with epiphytes when it occurs in the moist regions. Endemic.

AIZOACEAE

Mollugo L.

M. flavescens Anderss. (1), 226, (2), 96, t. 15, f. 2; Rob. (1), 143.—ALBEMARLE ISL.: *Darwin; Macrae; Baur.* CHARLES ISL.: *Snodgrass and Heller.* CHATHAM ISL.: Sappho Cove, in lava crevices at 800 ft. (no. 1466); Wreck Bay, *Baur.* INDEFATIGABLE ISL.: north side, *Snodgrass and Heller.* Endemic.

Var. **floriana** Rob. (1), 143.—CHARLES ISL.: Cormorant Bay, abundant in coarse gravelly soil near the shore (no. 1467). Endemic.

M. gracillima Anderss. (1), 226, (2), 96; Rob. (1), 143.—ALBEMARLE ISL.: Iguana Cove, occasional in ashy soil on sides of the cliff above the cove (no. 1468); Tagus Cove, abundant in tufaceous soil (no. 1470); Villamil, common in open places at 550 ft. (no. 1469). BRATTLE ISL.: (no. 1471). CHARLES ISL.: common in open grassy areas at 600 ft. The specimens taken here are very small, but they seem to possess the characters of this species, (no. 1472). CHATHAM ISL.: Basso Point, occasional in lava crevices (no. 1473). DUNCAN ISL.: common in dry places near the shore (no. 1474). JAMES ISL.: Orchilla Bay, *Baur.* NARBOROUGH ISL.: north side, common on lava beds (no. 1476). WENMAN ISL.: (no. 1477). Endemic.

M. Snodgrassii Rob. (1), 144.—Albemarle Isl.: Cowley Bay, bushes 1 ft. and more in height, rare in pumice soil, (no. 1478); Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller.* Narborough Isl.: Mangrove Point, *Snodgrass and Heller.* Endemic.

Sesuvium L.

S. Edmonstonei Hook. f. (3), 221; Rob. (1), 144.—Barrington Isl.: common covering rocks along the shore (no. 1479). Brattle Isl.: (no. 1480). Charles Isl.: common on sand beaches, forming bright red patches when seen from a distance, (no. 1481). Culpepper Isl.: common on the sides of cliffs. Duncan Isl.: common among rocks along the shore and in occasional patches up to 250 ft. (no. 1482). Gardner Isl. (near Hood Isl.): *Snodgrass and Heller.* Hood Isl.: very abundant on the tops of the cliffs at the east end of the island (no. 1483). The stems and leaves of this plant are usually bright red when it grows in open sunny places, but are green with but a small amount of the red color when it grows in the shade. Endemic.

S. Portulacastrum L. Syst. Nat. ed. 10, 1058 (1760); Rob. (1), 144.—Abingdon Isl.: occasional on sand beaches. Albemarle Isl.: Elizabeth Bay, *Snodgrass and Heller;* Turtle Cove, abundant on sand beaches (no. 1484). Barrington Isl.: on sand beaches. Charles Isl.: forms thick mats on sand beaches. It also occurs around the shores of salt lagoons where the water is saturated with salt. In such situations the leaves are somewhat reduced in size, (no. 1485). Chatham Isl.: Sappho Cove, common on sand beaches (no. 1486). Indefatigable Isl.: southeast side, common on sand dunes (no. 1487). James Isl.: northeast side, on sand beaches. Seymour Isl., north: *Snodgrass and Heller.* Further distr. S. U. S., W. Ind., S. Am., China.

Trianthema L.

T. Portulacastrum L. Sp. Pl. 223 (1753); Rob. (1), 144.—Albemarle Isl.: Turtle Cove, fairly abundant on sand beaches (no. 1488); Villamil, in dry sandy soil in open places near sea level (no. 1489). Barrington Isl.: *Snodgrass and*

Heller. CHARLES ISL.: common near the shore and in loose ashy soil at 450 ft. (nos. 1490-1491). CHATHAM ISL.: *Andersson.* DUNCAN ISL.: (no. 1492). GARDNER ISL. (near HOOD ISL.): abundant in loose soil mixed with fragments of lava (no. 1493). HOOD ISL.: *Snodgrass and Heller.* INDEFATIGABLE ISL.: *Andersson.* JAMES ISL.: *Andersson.* SEYMOUR IDS., NORTH and SOUTH: *Snodgrass and Heller.* Widely distributed on tropical shores.

Aizoacea (?) sp. Sterile specimens of bushes 4-5 ft. high with succulent leaves were collected on BRATTLE ISL. and on the beach at Cormorant Bay, CHARLES ISL. The family is doubtful (nos. 1494-1495).

PORTULACACEAE

Portulaca L.

P. oleracea L. Sp. Pl. 445 (1753); Rob. (1), 145.—ABINGDON ISL.: common among rocks on the lower parts of the island (no. 1496). ALBEMARLE ISL.: Iguana Cove, abundant on the sides of the cliffs above the cove (no. 1498); Tagus Cove, common in tufaceous soil on the lower parts; Villamil, abundant in open places in the lower parts (no. 1497). CHARLES ISL.: common around 1750 ft. during the dry season; during the rainy season it occurs abundantly all over the lower parts of the island, (no. 1499). CHATHAM ISL.: Wreck Bay, common at 450 ft. (nos. 1500-1501). GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: occasional at 250 ft. (no. 1502). NARBOROUGH ISL.: north side, common in crevices in the lava (no. 1503). The fact that this species is found on such unfrequented islands as Abingdon and Narborough would seem to indicate that it might not have been distributed by intercommunication among the islands as suggested by Robinson, l. c. At the time Dr. Robinson's paper was written it had only been found on the more frequented islands. Widely distributed.

P. sp. (?). Sterile specimens of a species of *Portulaca* (?), were found on ABINGDON, BARRINGTON, BRATTLE, CHARLES, JERVIS, and WENMAN ISLANDS. It is the *P.* sp.?, mentioned by Robinson, l. c. 145. (nos. 1504-1510).

P. sp.—CHATHAM ISL.: Sappho Cove, low bushes on lava in the vicinity of the coast. The specimen has a brownish-gray succulent stem, linear leaves, and rather large pinkish-white flowers. It is a new species to the islands and possibly to science, but the specimen is too poor for accurate description (no. 1511).

CARYOPHYLLACEAE

Drymaria Willd.

D. cordata (L.) Willd. ex Roem. & Sch. Syst. V. 406 (1819). *Holosteum cordatum* L. Sp. Pl. 88 (1753). *Drymaria cordata* Willd. l. c.; Rob. (1), 145.—ALBEMARLE ISL.: Tagus Cove, abundant in open places on the inner wall of the crater at 4000 ft. (no. 1512); Villamil; common in moist places, 600-1300 ft., (no. 1513). CHARLES ISL.: occasional in vegetable mold among rocks, 1000-1450 ft., (nos. 1514-1516). CHATHAM ISL.: Wreck Bay, common above 900 ft. (no. 1517). JAMES ISL.: *Darwin.* Widely distributed.

MENISPERMACEAE

Cissampelos L.

C. galapagensis nov. sp.

Scandens lignosa, caulibus canaliculatis glabris subtus glaucis; foliorum laminis peltatis triangularibus vel subcordatis 4.3 cm. longis 4.7 cm. latis apice obtusis vel rotundatis mucronatis utrinque subglaucis, petiolis 8-44 mm. longis canaliculatis; inflorescentia mascula axillari cymosa longipedunculate ad pedunculi basis bractea membranacea praedita; sepalis orbiculari-rhombeis 1.5 mm. longis, nervo medio prominulo; corolla disciformi 1.2 mm. lata.

INDEFATIGABLE ISL.: Academy Bay, abundant on bare lava in rather open woods near the coast. A species which is closely related to *C. glaberrima* St. Hil. but differs principally in having the male flowers in cymes instead of panicles, and in the sepals being orbicular rhombic instead of lanceolated, with a medium rib on each, (nos. 1518-1519). Plate III, figs. 9-10. Endemic.

C. Pareira L. Sp. Pl. 1031 (1753); Rob. (1), 146.—ABINGDON ISL.: common above 500 ft. (no. 1523). ALBEMARLE ISL.: Cowley Bay, occasional at 1600-2000 ft., abundant on trees above 2000 ft.; Iguana Cove, common on trees and bushes everywhere (no. 1522); Tagus Cove, common at 2000 ft.; Villamil, abundant covering rocks in a moist area on the lower parts some distance back from the shore, abundant throughout the transition and moist regions, (nos. 1520-1521). CHARLES ISL.: abundant in woodland at 1000 ft., covering rocks and trees at 1450 ft., (nos. 1524-1526). CHATHAM ISL.: Basso Point, abundant in woodland above 900 ft.; Wreck Bay, common throughout the wooded areas below 1000 ft. (no. 1527). DUNCAN ISL.: occasional on bushes at 1200 ft. (no. 1528). INDEFATIGABLE ISL.: Academy Bay, abundant on trees above 100 ft., around 600 ft. it covers the trees and bushes with a dense growth, (nos. 1530-1531); northeast side, common above 300 ft.; southeast side, fairly common on bushes at 600 ft. (no. 1529). JAMES ISL.: James Bay, abundant on trees and bushes above 1000 ft. (no. 1532); northeast side, fairly common above 400 ft. NARBOROUGH ISL.: north side, (no. 1533). This species shows much variation in the size, shape, and amount of pubescence on the leaves. Further distr. general in tropical regions.

ANONACEAE

Anona L.

A. cherimolia Mill. Gard. Dict. ed. VIII. n. 5 (1768).—CHARLES ISL.: forming a small grove at 1000 ft. Probably introduced, (no. 1535). Further distr. Mex., W. Ind., S. Am.

A. glabra L. Sp. Pl. 537 (1753).—ALBEMARLE ISL.: Villamil, bushes and small trees in low moist places in the vicinity of the shore (no. 1536). Further distr. S. U. S., W. Ind.

CRUCIFERAE

Brassica L.

B. arvensis (L.) Kze. Rev. Gen. I. 19 (1891). *Sinapis arvensis* L. Sp. Pl. 668 (1753). *B. Sinapistrum* Boiss. Voy. Esp. II. 39 (1839-1845); Rob. (1), 146.—CHARLES ISL.: *Andersson.* Widely distributed.

B. campestris L. Sp. Pl. 666 (1753); Rob. (1), 146.—CHARLES ISL.: *Snodgrass and Heller.* CHATHAM ISL.: Wreck

Bay, around habitations at 900 ft. Probably introduced. Widely distributed.

Coronopus Ludw.

C. didymus (L.) Sm. Fl. Brit. II. 691 (1800). *Lepidium didymum* L. Mant. 92 (1767). *Senebiera pinnatifida* DC. Mém. Soc. Hist. Nat. Par. VII. 144, t. 9 (1799); Rob. (1), 146.—ALBEMARLE ISL.: Villamil, abundant in open grassy country around 1300 ft. (no. 1540). JAMES ISL.: *Darwin*. Widely distributed.

Lepidium L.

L. virginicum L. Sp. Pl. 645 (1753).—CHATHAM ISL.: Wreck Bay, around habitations, probably introduced, (no. 1538). Widely distributed.

Raphanus L.

R. sativus L. Sp. Pl. ed. 2, 935 (1763); Rob. (1), 146.—CHARLES ISL.: *Andersson*. CHATHAM ISL.: Wreck Bay, in cultivated ground. A species concerning whose introduction there can be but little doubt, (no. 1539). Widely distributed through cultivation.

CRASSULACEAE

Crassuvia Comm.

C. floripendia Comm. ex. Lam. Encycl. II. 141 (1786). *Bryophyllum calycinum* Salisb. Parad. Lond. t. 3 (1806).—CHATHAM ISL.: Wreck Bay, around habitations. Probably introduced. Further distr. U. S., Mex., W. Ind., S. Am.

LEGUMINOSAE

Acacia Willd.

A. farnesiana (L.) Willd. Sp. IV. 1083 (1806). *Mimosa farnesiana* L. Sp. Pl. 521 (1753). *A. farnesiana* Willd. l. c.; Rob. (1), 147.—ALBEMARLE ISL.: *Darwin; Macrae*. INDEFATIGABLE ISL.: north side, small trees at 250 ft. (no. 1541). Further distr. Mex., S. Am.

A. macracantha H. & B. in Willd. Sp. IV. 1080 (1806); Rob. (1), 147.—ALBEMARLE ISL.: Tagus Cove, small trees and bushes in tufaceous soil, lower parts, (no. 1544); Villamil, bushes and small trees below 100 ft. (nos. 1542-1543, 1545). Charles Isl.: common below 700 ft., varying in size from low bushes to trees 25 ft. in height, (nos. 1547-1549). Chatham Isl.: Wreck Bay, bushes 6-7 ft. high at 300 ft. (no. 1550). Duncan Isl.: prostrate bushes at 1275 ft. (no. 1551). Hood Isl.: occasional bushes and small trees (no. 1552). Indefatigable Isl.: Academy Bay, low trees and bushes below 100 ft. (no. 1556); north side, bushes and low spreading trees above 100 ft. (no. 1557); southeast side, common bushes, often prostrate, (nos. 1559-1560). Further distr. W. Ind., S. Am.

A. tortuosa (L.) Willd. Sp. IV. 1083 (1806). *Mimosa tortuosa* L. Sp. Pl. ed. 2, 1505 (1763). *A. tortuosa* Willd. l. c.; Rob. (1), 147.—Charles Isl.: *Andersson.* Chatham Isl.: *Andersson.* Indefatigable Isl.: northeast side, low bushes near the shore (nos. 1615-1616); southeast side, occasional bushes. James Isl.: northeast side, (no. 1667); James Bay, small trees 10-12 ft. high on the lower parts. Further distr. Mex., W. Ind., S. Am.

A. sp. affin. *A. macracantha* H. & B.; Rob. (1), 147.—Albemarle Isl.: Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller.*

A. sp.? Hook. f. (4), 261; Rob. (1), 147.—Charles Isl.: *Edmonston.*

A. sp. Rob. (1), 147.—James Isl.: *Snodgrass and Heller.*

Astragalus L.

A. Edmonstonei (Hook. f.) Rob. (1), 148. *Phaca Edmonstonei* Hook. f. (3), 227.—Charles Isl.: *Edmonston.* Endemic.

Caesalpinia L.

C. Bonducella (L.) Fleming in As. Res. XI. 159 (1810). *Guilandina Bonducella* L. Sp. Pl. ed. 2, 545 (1763). *C. Bonducella* Fleming l. c.; Rob. (1), 148.—Albemarle Isl.: Villamil, bushes 4-6 ft. high in low moist places near sea level (no. 1619). Further distr. general in warm countries.

C. pulcherrima (L.) Sw. Obs. 166 (1791). *Poinciana pulcherrima* L. Sp. Pl. 380 (1753). *C. pulcherrima* Sw. l. c.;

Rob. (1), 148.—Charles Isl.: common in the vicinity of former habitations. Chatham Isl.: Wreck Bay, in gardens around 1000 ft. Further distr. general in tropics.

Canavalia Adans.

C. obtusifolia (Lam.) DC. Prodr. II. 404 (1825). *Dolichos obtusifolius* Lam. Dict. II. 295 (1786). *C. obtusifolia* DC. l. c.; Rob. (1), 148.—Bindloe Isl.: on the shore and in the interior of the island (no. 1620). Further distr. general in tropics.

Cassia L.

C. hirsuta L. Sp. Pl. 378 (1753); Rob. (1), 148.—Charles Isl.: *Lee.* Further distr. Mex., S. Am.

C. occidentalis L. Sp. Pl. 377 (1753); Rob. (1), 148.—Albemarle Isl.: Iguana Cove, occasional low bushes (no. 1622); Villamil, occasional low bushes in lava crevices on the lower parts of the island to 600 ft. (nos. 1621, 1623). Charles Isl.: *Andersson; Snodgrass and Heller.* Chatham Isl.: Wreck Bay, low bushes, 150-800 ft., (nos. 1624-1625). Widely distributed.

C. picta Don. Syst. II. 444 (1832); Rob. (1), 149.—Albemarle Isl.: Cowley Bay, common bushes in open country, 1500-2000 ft., (no. 1628); Iguana Cove, low bushes at 200 ft. (no. 1629); Tagus Cove, low bushes, 1500-2200 ft., (no. 1626); Villamil, low bushes in woodland, 100-550 ft., (no. 1627). Charles Isl.: rare at 350 ft. (no. 1630). Chatham Isl.: Wreck Bay, occasional bushes 4-5 ft. high at 200 ft. (nos. 1631-1632). Further distr. Ecuador.

C. sericea Sw. Prodr. 66 (1788); Rob. (1), 149.—Chatham Isl.: *Andersson.* Indefatigable Isl.: *Andersson.* Seymour Isl., south: *Snodgrass and Heller.* Further distr. Mex., W. Ind., S. Am.

Crotalaria L.

C. glabrescens Anderss. (1), 248, (2), 109; Rob. (1), 149. —Albemarle Isl.: Tagus Cove, common in tufaceous soil on the lower parts (no. 1633). Chatham Isl.: *Andersson; A. Agassiz.* Endemic.

C. pumila Ort. Dec. II. 23 (1797); Rob. (1), 149.—Abingdon Isl.: occasional at 1100 ft. (no. 1634). Albemarle Isl.: Iguana Cove, common at 500 ft. (no. 1640); Tagus Cove, occasional on lava beds at 600 ft., common at 4000 ft., (no. 1637); Villamil, occasional to 550 ft. (nos. 1636, 1639, 1643). Charles Isl.: occasional in protected places at 1650 ft. (no. 1644). Chatham Isl.: *Andersson; Baur; Snodgrass and Heller.* Indefatigable Isl.: southeast side, occasional in tufaceous soil at 550 ft. (no. 1645). James Isl.: James Bay, *Snodgrass and Heller.* Narborough Isl.: *Snodgrass and Heller.* Seymour Isl., south: *Snodgrass and Heller.* Further distr. Mex., W. Ind.

C. setifera DC. Prodr. II. 131 (1825); Rob. (1), 149.—Abingdon Isl.: fairly common at 400 ft. (no. 1646). Albemarle Isl.: Tagus Cove, abundant at 4000 ft. (no. 1647); Villamil, occasional, 250-800 ft., (no. 1648). Indefatigable Isl.: Academy Bay, common, 4-6 ft. high, in a dense growth of vines and bushes, 500-600 ft., (no. 1650); northwest side, occasional in tufaceous soil near the shore. Further distr. Mex.

Dalea L.

D. domingensis DC. Prodr. II. 246 (1825).—Chatham Isl.: Basso Point, bushes 5-6 ft. high at 900 ft. (no. 1651). Further distr. S. U. S., Mex., W. Ind., S. Am.

D. parvifolia Hook. f. (3), 225; Rob. (1), 150.—Albemarle Isl.: Tagus Cove, *Snodgrass and Heller.* Charles Isl.: bushes 5 ft. high at 550 ft. (no. 1652). Chatham Isl.: *Andersson.* Indefatigable Isl.: Academy Bay, common bushes on the lower parts (no. 1654); southeast side, occasional bushes 4-5 ft. high at 400 ft. (no. 1653); northwest side, *Baur.* James Isl.: *Darwin; Baur.* Endemic.

D. tenuicaulis Hook. f. (3), 226; Rob. (1), 150.—Albemarle Isl.: Tagus Cove, bushes 4-5 ft. high to 2500 ft. (no. 1655); Villamil, *Baur.* Chatham Isl.: *Andersson.* Endemic.

Desmanthus Willd.

D. depressus H. & B. ex. Willd. Sp. IV. 1046 (1806); Rob. (1), 150.—Abingdon Isl.: occasional among rocks at 550

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ft. (no. 1656). CHARLES ISL.: common near the shore, and at 550 ft., (nos. 1657-1658). CHATHAM ISL.: *A. Agassiz; Baur.* DUNCAN ISL.: among rocks on the lower parts (no. 1659). GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: occasional among rocks (nos. 1660-1661). JERVIS ISL.: (no. 1662). Further distr. S. U. S., Mex., W. Ind., S. Am.

Desmodium Desv.

D. galapagense Rob. (1), 150. *D. filiforme* Hook. f. (3), 227.—JAMES ISL.: *Darwin.* Endemic.

D. incanum (Sw.) DC. Prodr. II. 332 (1825). *Hedysarum incanum* Sw. Prodr. 107 (1788). *D. incanum* DC. l. c.; Rob. (1), 150.—CHATHAM ISL.: Wreck Bay, occasional in open woodland at 350 ft., very abundant in the open grassy country above 700 ft., (nos. 1663-1664). Further distr. Mex., W. Ind., S. Am., Old World.

D. molle (Vahl.) DC. Prodr. II. 332 (1825). *Hedysarum molle* Vahl. Symb. II. 83 (1790). *D. molle* DC. l. c.; Rob. (1), 150.—ABINGDON ISL.: occasional around 600 ft. (no. 1665). ALBEMARLE ISL.: Tagus Cove, common in tufaceous soil around the sides and base of the mountain (no. 1666). BINDLOE ISL.: *Baur; Snodgrass and Heller.* CHARLES ISL.: *Andersson; Baur.* GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: *Snodgrass and Heller.* INDEFATIGABLE ISL.: north side, *Snodgrass and Heller;* northwest side, rare in tufaceous soil near the shore (no. 1667). JERVIS ISL.: *Baur.* Further distr. Mex., W. Ind., S. Am.

D. spirale (Sw.) DC. Prodr. II. 332 (1825). *Hedysarum spirale* Sw. Prodr. 107 (1788). *D. spirale* DC. l. c.; Rob. (1), 151.—ALBEMARLE ISL.: Iguana Cove, abundant on the sides of the cliffs above the cove (no. 1562); Tagus Cove, occasional on the lower parts (no. 1561). BINDLOE ISL.: *Baur.* CHARLES ISL.: rare near the shore and from 500-800 ft. (nos. 1563-1565). GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: *Snodgrass and Heller.* JAMES ISL.: *Snodgrass and Heller.* SEYMOUR ISL., NORTH: *Snodgrass and Heller.* Further distr. Mex.. W. Ind., S. Am., Old World.

D. uncinatum (Jaq.) DC. Prodr. II. 331 (1825). *Hedysarum uncinatum* Jaq. Hort. Sch. III. t. 298 (1798). *D. uncinatum* DC. l. c.; Rob. (1), 151.—ALBEMARLE ISL.: Tagus Cove, common above 3,000 ft. (no. 1566). CHATHAM ISL.: Wreck Bay, *Baur.* INDEFATIGABLE ISL.: Academy Bay, among a dense growth of vines and bushes at 500 ft. (no. 1567). Further distr. Mex., W. Ind., S. Am.

Erythrina L.

E. velutina Willd. Ges. Naturf. Fr. Neue Schr. III. 426 (1801); Rob. (1), 151.—ALBEMARLE ISL.: Banks Bay, acc. to *F. X. Williams.* INDEFATIGABLE ISL.: Academy Bay, small trees in the vicinity of the shore; northeast side, small trees about two miles inland (no. 1668); northwest side, small trees to 750 ft. JAMES ISL.: James Bay, large forest trees from near the shore to 1200 ft.; northeast side, small trees above 300 ft. WENMAN ISL.: the grove of leafless trees, mentioned by *Heller,* Rob. (1), 251, belongs to this species. This species sometimes forms forest trees three feet in diameter at the base and more than sixty feet in height. It is the largest tree found in the dry regions. Further distr. W. Ind., S. Am.

Galactea P. Br.

G. Jussiaeana Kunth, var. **glabrescens** Benth. in Mart. Fl. Bras. XV. pt. 1, 143 (1859); Rob. (1), 152.—CHATHAM ISL.: Basso Point, occasional at 1000 ft. (no. 1585); Wreck Bay, (no. 1586). HOOD ISL.: generally distributed over the island but not common (no. 1587). Further distr. Brazil.

Var. **volubilis** Benth. l. c.; Rob. (1), 151.—ABINGDON ISL.: occasional vines on the lower parts of the island (no. 1571). ALBEMARLE ISL.: Iguana Cove, common on bushes on the lower parts (no. 1574); Tagus Cove, occasional on bushes on the sides of the mountain (no. 1572); Villamil, common on bushes to 400 ft. (no. 1573). CHARLES ISL.: on bushes, 575-1000 ft., (nos. 1576-1577). CHATHAM ISL.: Sappho Cove, abundant in lava crevices (no. 1579). DUNCAN ISL.: occasional at 700 ft., abundant on rocks at 1275 ft., (no. 1580). GARDNER ISL. (near HOOD ISL.): (no. 1582). INDEFATIGABLE ISL.: north side, common on lava near the shore (no. 1583). JAMES ISL.: James Bay, on the lower parts of the island. JERVIS ISL.: occasional at 1000 ft. (no. 1584). NARBOROUGH ISL.: north side, *Snodgrass and Heller*. SEYMOUR ISL., NORTH: *Snodgrass and Heller*. None of the specimens of this species from the Galapagos Islands, either in the Gray Herbarium or in the Academy's collection, shows the ciliated standard as described and figured by Kunth, Mimos. 197, t. 55. There is also much variation in the size and shape of the leaves, as well as in the amount of pubescence. Further distr. S. Am.

G. tenuiflora (Willd.) Wight & Arn. Prodr. I. 206 (1834). *Glycine tenuiflora* Willd. Sp. III. 1059 (1801-1803). *Galactea dubia* DC. Prodr. II. 238 (1825).—INDEFATIGABLE ISL.: southeast side, common vines at 600 ft. (no. 1569). JAMES ISL.: James Bay, occasional on the lower parts of the island (no. 1570). All of the specimens collected are sterile, but they closely resemble specimens of this species in the Gray Herbarium in the foliage and in the length of the racemes. Further distr. Mex., W. Ind., S. Am., Old World.

G. n. sp. Hook. f. (4), 261; Rob. (1), 152.—CHARLES ISL.: *Edmonston.*

Geoffroea Jacq.

G. striata (Willd.) Morong, Ann. N. Y. Acad. Sc. VII. 87 (1893), as *Geoffroya striata. Robinia striata* Willd. Sp. III. 1132 (1803). *Geoffraea superba* H. & B. Pl. Aequin. II. 69, t. 100 (1809); Rob. (1), 152.—CHARLES ISL.: a grove of low spreading trees of this species is found in the vicinity of an old habitation at 450 ft. The specimens collected by *Snodgrass and Heller* are probably from this locality and not Hood Isl., as there are evidently no trees of this species there. The grove on Charles Isl. is just to the right of the main trail leading into the interior of the island, and is so situated that it would hardly be missed by any one collecting plants in the locality. (no. 1588). Further distr. trop. S. Am.

Inga Scop.

I. edulis Mart. Herb. Fl. Bras. 113 (1837).—CHARLES ISL.: trees 20-30 ft. high in wet soil around a spring at 1000 ft. (no. 1589). Further distr. Mex.. S. Am.

I. sp.—CHATHAM ISL.: Wreck Bay, in gardens. Probably introduced.

Mimosa L.

M. asperata L. Syst. Nat. ed. 10, 1312 (1760); Rob. (1), 152.—CHARLES ISL.: *Edmonston.* Widely distributed in tropical and sub-tropical regions.

Mucuna Adans.

M. rostrata Benth. in Mart. Fl. Bras. XV. 1, 171 (1859-1862).—INDEFATIGABLE ISL.: Academy Bay, vines on trees at 700 ft. *Frederick T. Nelson* collector, (no. 1590). Further distr. Brazil.

Neptunia Lour.

N. plena (L.) Benth. in Hook. Jour. Bot. IV. 355 (1842). *Mimosa plena* L. Sp. Pl. 519 (1753). *N. plena* Benth. l. c.; Rob. (1), 152.—CHARLES ISL.: *Edmonston* (?); *Andersson;* Cuevas Bay, *Baur.* CHATHAM ISL.: Wreck Bay, in open places among rocks to 200 ft. (no. 1591). GARDNER ISL. (near HOOD ISL.): common among rocks. INDEFATIGABLE ISL.: north side, *Snodgrass and Heller;* northeast side, in loose ashy soil near the shore (no. 1594); northwest side, abundant in tufaceous soil near the shore. JERVIS ISL.: *Baur.* SEYMOUR IDS., NORTH and SOUTH: *Snodgrass and Heller.* Further distr. Mex., W. Ind., S. Am.

Parkinsonia L.

P. aculeata L. Sp. Pl. 375 (1753); Rob. (1), 152.—ALBEMARLE ISL.: Villamil, small trees abundant in rather low places near the shore (no. 1595). CHARLES ISL.: Post Office Bay, occasional small trees near the shore, and in the low flat country for some distance inland, where they form dense low forests with *Prosopis dulcis.* The craters around 450 ft. are often filled with these trees, (no. 1596). CHATHAM ISL.: Wreck Bay, small trees, abundant to 200 ft., (no. 1597). DUNCAN ISL.: abundant in a deep canyon on the northeast side of the island. HOOD ISL.: occasional bushes and small trees (no. 1598). INDEFATIGABLE ISL.: southeast side, fairly common all over the lower parts of the island (no. 1600). SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* Further distr. S. U. S., Mex., W. Ind., S. Am.

Phaseolus L.

P. adenanthus G. F. W. Mey. Prim. Fl. Esseq. 239 (1818); Rob. (1), 153.—HOOD ISL.: *Snodgrass and Heller.* Further distr. tropics of New World, introduced (?), in E. Ind.

P. mollis Hook. f. (3), 228; Rob. (1), 153.—JAMES ISL.: *Darwin.* JERVIS ISL.: *Baur.* Specimen from Jervis Isl. somewhat doubtful acc. to Rob. l. c. Endemic.

P. semierectus L. Mant. I 100 (1767); Rob. (1), 153.—CHARLES ISL.: occasional in open thickets of *Lipochaeta laricifolia* at 850 ft. (no. 1601). CHATHAM ISL.: Wreck Bay, common in sandy soil near the shore (no. 1602). Further distr. general in tropics.

P. vulgaris L. Sp. Pl. 723 (1753).—ALBEMARLE ISL.: Iguana Cove, common on the sides of the cliffs above the cove (no. 1603); Tagus Cove, common in thickets at 4000 ft. This species was probably introduced. Widely distributed.

P. (?) sp.—CHATHAM ISL.: Wreck Bay, sterile specimens with large leaves, the genus of which is in doubt.

Piscidia L.

P. Erythrina L. Sp. Pl. ed. 2, 993 (1763); Rob. (1), 153.—CHATHAM ISL.: Wreck Bay, common trees on the lower parts (no. 1608). INDEFATIGABLE ISL.: Academy Bay, forest trees, fairly common to 350 ft., (no. 1607); north side, common bushes in sand and in lava crevices near the shore, small trees around 500 ft., (no. 1606); northwest side, fairly common from the vicinity of the shore to 800 ft., small near the shore, but increasing in size with elevation, forming good sized trees at the upper limit of distribution, (no. 1607). JAMES ISL.: (?) acc. to Rob. l. c. Further distr. Mex., W. Ind., S. Am.

Prosopis L.

P. dulcis Kunth, Mimos. 110, t. 34 (1819); Rob. (1), 153.—ABINGDON ISL.: common bushes on lava beds near the shore (no. 1609). ALBEMARLE ISL.: Villamil, common in low thickets on the lower parts, where it forms a very important element of the flora in places. BARRINGTON ISL.: occasional decumbent bushes around dried pools in the interior of the island (no. 1610). CHARLES ISL.: common bushes, forming open thickets near the shore, and trees around 650 ft., (nos. 1611-1613). CHATHAM ISL.: Wreck Bay, occasional low spreading trees in sandy soil near the shore (no. 1614). DUNCAN ISL.: occasional near the shore; at 1000 ft. it is very abundant as prostrate and decumbent bushes, often covering considerable areas on the floor of the crater; occasional at 1275 ft. The prostrate habit on the upper parts is probably due to the wind, (no. 1668). GARDNER ISL. (near HOOD ISL.): common bushes (no. 1670). HOOD ISL.: common bushes all over the island (nos. 1671-1673). INDEFATIGABLE ISL.: southeast side, common bushes to 600 ft. (nos. 1674-1675); northeast side, small stunted trees near the shore (no. 1676). JAMES ISL.: James Bay, *Snodgrass and Heller.* JERVIS ISL.: occasional prostrate bushes at 1050 ft. (no. 1677). SEYMOUR ISL., SOUTH: occasional bushes (no. 1678). Further distr. S. U. S., Mex., S. Am.

Rhynchosia Lour.

R. minima (L.) DC. Mém. Leg. IX. 363 (1825). *Dolichos minimus* L. Sp. Pl. ed. 2, 1020 (1763). *R. minima* DC. l. c.; Rob. (1), 154.—ABINGDON ISL.: common to above 1000 ft. The series of specimens from this island show well the marked foliar differences which occur between individuals from the dry and moist regions on practically all of the islands where this species is found at low and high levels. The specimens from the dry region have the leaflets villous on both surfaces, margins strongly reflexed, resin dots numerous and dark brown in color, venation prominent on the under surface; size of leaflets, 5.5 by 7 mm. Specimens from above 1000 ft. have the upper surface of the leaflets atomiferous, the lower softly pubescent, margins but slightly reflexed, resin dots few and amber colored, venation not prominent; size of leaflet, 31 by 43 mm. Specimens from 600 and 700 ft. show characters which closely correspond with the specimen from 1000 ft. except that the leaflets are smaller, (nos. 1679-1682). ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, common in the vicinity of the cove; Tagus Cove, abundant in open areas in tufaceous soil all over the lower parts (no. 1683).

Barrington Isl.: *Snodgrass and Heller.* Bindloe Isl.: abundant near the shore, rare in the interior, (no. 1685). Charles Isl.: *Andersson.* Chatham Isl.: Basso Point, occasional at 900 ft. (no. 1688); Wreck Bay, abundant all over the lower parts (nos. 1686-1687). Indefatigable Isl.: Academy Bay, common all over the lower parts. All of the specimens taken in this locality are xerophytic in character, except a few which were found growing around a brackish water spring near the coast. These were mesophytic in character, closely resembling specimens taken from the transition or moist regions of other islands, (nos. 1691-1692); north side, common on rocks at 300 ft. (no. 1690); northwest side, common in tufaceous soil near the shore (no. 1693). Narborough Isl.: south side, *Snodgrass and Heller.* Further distr. tropical and subtropical regions.

R. reticulata (Sw.) DC. Prodr. II. 385 (1825). *Glycine reticulata* Sw. Prodr. 105 (1788). *R. reticulata* DC. l. c.: Rob. (1), 154.—Chatham Isl.: *Darwin.* Further distr. Mex., W. Ind., S. Am.

R. sp. Rob. (1), 154.—Albemarle Isl.: Tagus Cove, *Snodgrass and Heller.*

R. sp. Rob. (1), 154.—Bindloe Isl.: *Snodgrass and Heller.*

Stylosanthes Sw.

S. scabra Vog. Linnaea XII. 69 (1838); Rob. (1), 154.—Abingdon Isl.: occasional on lava beds on the lower parts (no. 1694). Albemarle Isl.: Tagus Cove, forming spreading bunches in tufaceous soil near the shore (no. 1695). Bindloe Isl.: occasional in tufaceous soil near the beach (no. 1696). Charles Isl.: common in ashy soil, 450-1000 ft., (no. 1697). Duncan Isl.: occasional in shady protected places near the shore (no. 1698). Indefatigable Isl.: north side, *Snodgrass and Heller;* northwest side, common in tufaceous soil near the shore (no. 1699). Jervis Isl.: *Baur.* Further distr. Cent. and S. Am.

Tephrosia Pers.

T. cinerea (L.) Pers. Syn. II. 328 (1807). *Galega cinerea* L. Syst. ed. 10, 1172 (1760). *T. cinerea* Pers. l. c.; Rob. (1).

155.—ABINGDON ISL.: common to 400 ft. (no. 1700). ALBEMARLE ISL.: Tagus Cove, abundant in open places at 250 ft. BARRINGTON ISL.: *Snodgrass and Heller.* BINDLOE ISL.: *Baur; Snodgrass and Heller.* CHARLES ISL.: common on the lower parts, occasional at 600 ft., (no. 1703). CHATHAM ISL.: Sappho Cove, occasional on recent lava near the shore (no. 1704). DUNCAN ISL.: in shady places on the lower parts (no. 1705). HOOD ISL.: rare around 250 ft., specimens being small and rather stunted, (no. 1706). INDEFATIGABLE ISL.: north side, *Snodgrass and Heller.* NARBOROUGH ISL.: *Snodgrass and Heller.* SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* Further distr. Mex., W. Ind., S. Am.

Vigna Savi.

V. owahuensis Vog. Linnaea X. 585 (1836); Rob. (1), 155. —JAMES ISL.: *Darwin.* The identity of this plant is questioned by Rob. l. c.

Zornia Gmel.

Z. diphylla (L.) Pers. Syn. II. 318 (1807). *Hedysarum diphyllum* L. Sp. Pl. 747 (1753).—ALBEMARLE ISL.: Tagus Cove, common in tufaceous soil, 300-500 ft., (no. 1707). Widely distributed in tropical regions.

OXALIDACEAE

Oxalis L.

O. carnosa Molina, Sagg. Chile, ed. 2, 288 (1810); Rob. (1), 156.—ABINGDON ISL.: common on exposed rocks in open grassy areas around 1100 ft. (no. 1708). CHARLES ISL.: common among rocks at 1550 ft. (no. 1709). DUNCAN ISL.: on rocks at 900 ft. and in vegetable mold on side of cliff at 1250 ft. (no. 1710). This species usually inhabits rather sterile places in the transition and moist regions, the roots finding a lodgement in small crevices in the lava. Further distr. Chili.

O. Cornelli Anderss. (1), 246, (2), 108; Rob. (1), 156.—ALBEMARLE ISL.: Iguana Cove, common in open places on the lower parts (no. 1713). BARRINGTON ISL.: *Snodgrass and Heller.* CHARLES ISL.: common among rocks near the shore and in open country, 500-1100 ft., (nos. 1716-1717). CHATHAM ISL.: Wreck Bay, fairly common, 500-2050 ft., (nos. 1714-1715). DUNCAN ISL.: *A. Agassiz; Snodgrass and Heller.* GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: *Baur; Snodgrass and Heller.* INDEFATIGABLE ISL.: north side, *Snodgrass and Heller;* northwest side, *Andersson; Baur.* JAMES ISL.: James Bay, *Snodgrass and Heller.* Endemic.

O. corniculata L. Sp. Pl. 435 (1753); Rob. (1), 156.—ALBEMARLE ISL.: Villamil, common in open grassy country at 1500 ft. (no. 1718). CHARLES ISL.: common at 1700 ft. (no. 1719). CHATHAM ISL.: Wreck Bay, *Baur.* Widely distributed.

LINACEAE

Linum L.

L. oligophyllum Willd. ex. Schult. Sys. VI. 758 (1820); Rob. (1), 156.—ALBEMARLE ISL.: Tagus Cove, low bushes, 2900-3850 ft., (no. 1720). Further distr. Ecuador and Peru.

ZYGOPHYLLACEAE

Kallstroemia Scop.

K. adscendens (Anderss.) Rob. (1), 156. *Tribulus adscendens* Anderss. (1), 245.—CHARLES ISL.: *Andersson.* CHATHAM ISL.: *Andersson.* DUNCAN ISL.: *A. Agassiz.* GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: *Snodgrass and Heller.* Endemic.

Tribulus L.

T. cistoides L. Sp. Pl. 387 (1753); Rob. (1), 157.—ABINGDON ISL.: rare among rocks near the shore. The specimen is sterile, but agrees with other specimens of the species in foliage, pubescence, etc., (no. 1721). ALBEMARLE ISL.: Villamil, in broadly spreading bunches in light ashy soil near sea level (no. 1722). BRATTLE ISL.: (no. 1723). CHARLES ISL.: common near the shore, and in open places in the vegetation, 600-700 ft., (nos. 1725-1727). DAPHNE ISL.: *F. X. Williams,* collector, (no. 1728). HOOD ISL.: *Snodgrass and Heller.* INDE-

FATIGABLE ISL.: *Andersson.* JAMES ISL.: *Darwin.* NARBOROUGH ISL.: north side, common on lava beds. SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* Widely distributed.

Var. **anacanthus** Rob. (1), 157.—ALBEMARLE ISL.: Tagus Cove, common in tufaceous soil on the tops and sides of the hills surrounding the cove (no. 1730). Endemic.

T. sericeus Anderss. (1), 245, (2), 107; Rob. (1), 157.—CHARLES ISL.: occasional among rocks along the shore (no. 1732). CHATHAM ISL.: *Andersson.* Endemic.

T. sp. Rob. (1), 157.—CULPEPPER ISL.: sterile specimens, evidently of the same species as those collected by *Snodgrass and Heller* at this place, were found by *F. X. Williams,* (no. 1731).

RUTACEAE

Zanthoxylum L.

Z. Fagara (L.) Sarg. Gard. & For. III. 186 (1890). *Schinus Fagara* L. Sp. Pl. 389 (1753). *Z. Pterota* HBK. Nov. Gen. & Sp. VI. 3 (1823); Rob. (1), 158.—ABINGDON ISL.: common bushes above 450 ft.; above 1000 ft., small trees which are much covered with epiphytes. In the region around 1650 ft. they are scattered and somewhat stunted in appearance, (no. 1733). ALBEMARLE ISL.: Cowley Bay, occasional bushes at 600 ft., larger and more abundant above 1000 ft., (no. 1734); Iguana Cove, common bushes, forming dense thickets in places, (no. 1735); Tagus Cove, common bushes, 300-2200 ft.; Villamil, bushes on lava near the coast, increasing in size with the elevation until they form small forest trees around 1300 ft.; above 1500 ft. they form bushes or low stunted trees. A few specimens were found on the rim of the crater at 3150 ft., and on the floor at 2750 ft., (no. 1737). CHARLES ISL.: common bushes on the lower parts, small trees around 1000 ft., very abundant on the leeward sides of most of the craters 1000-1450 ft., (nos. 1738-1739). CHATHAM ISL.: Wreck Bay, common bushes and small trees, 150-800 ft., (no. 1740). DUNCAN ISL.: common bushes above 900 ft.; around 1200 ft. it forms low trees, (no. 1741). HOOD ISL.: low trees in a very restricted area around 600 ft. where it forms a belt around the top of the island (no. 1742). INDEFATIGABLE ISL.: Academy Bay, bushes in the vicinity of the shore, forest trees 20-40 ft. high above 350 ft., (no. 1744); northwest side, common bushes above 100 ft., trees above 700 ft., (no. 1743); southeast side, common bushes, forming almost impenetrable thickets, above 450 ft. It does not grow as large here as it does at Academy Bay. JAMES ISL.: James Bay, common bushes on the lower parts, small forest trees around 2000 ft., stunted bushes around 2850 ft. where it is exposed to the wind; northeast side, common bushes above 350 ft. (nos. 1745-1746). NARBOROUGH ISL.: south side, *Snodgrass and Heller.* This species seems to be one of the favorite host plants for *Phoradendron Henslovii.* Owing to its long recurved thorns it is one of the most disagreeable bushes to contend with when traveling on the lower parts of the islands. Further distr. S. U. S., Mex., W. Ind., S. Am.

SIMARUBACEAE

Castela Turp.

C. galapageia Hook. f. (3), 229, (4), 262; Rob. (1), 158.—ALBEMARLE ISL.: Cowley Bay, low bushes to 1100 ft. CHATHAM ISL.: *Darwin; Baur.* HOOD ISL.: low bushes around 600 ft.; no specimens were taken. Endemic.

Forma **albemarlensis** Rob. (1), 158. Forma *jervensis* Rob. (1), 159.—ALBEMARLE ISL.: Tagus Cove, common bushes on the lower parts (no. 1747); Villamil, common bushes on lava beds to 200 ft. (no. 1762). INDEFATIGABLE ISL.: northeast side, common bushes 6-8 ft. high in loose ashy soil near the shore. Stem unarmed; leaves for the most part cuneate with revolute margins, but some are obtusely oblong and mucronate as in the specimens from Albemarle, (no. 1748); northeast side, occasional bushes on the lower parts. The specimens from this part of the island are armed, leaves usually oblong obtuse mucronate, but some are lance-oblong acute, (no. 1749); southeast side, common bushes to 600 ft. Stem unarmed; leaves oblong obtuse mucronate, (no. 1750). JERVIS ISL.: *Baur.* Considering the great variability of the forms as shown by subsequent specimens, the form *jervensis* seems to agree rather too closely with the type specimen of form *albemarlensis* to be considered as a good form. NARBOROUGH ISL.: north side, bushes 5-6 ft. high on lava beds (no. 1651).

Forma **bindloensis** Rob. (1), 158.—BINDLOE ISL.: common bushes. The specimens have the stem armed and many of the leaves are obtuse cuneate, (no. 1752).

Forma **carolensis** Rob. (1), 158.—ABINGDON ISL.: common bushes to 500 ft. (no. 1753). CHARLES ISL.: bushes 6-7 ft. high to 700 ft. Specimens taken below 350 ft. have larger leaves than do those from around 700 ft., (nos. 1758-1759). CHATHAM ISL.: Wreck Bay, common bushes on the lower parts. The type specimen of the species was collected on this island by *Darwin* and is described by Hook. f., l. c., as being unarmed with the leaves linear lanceolate acute. The specimen under consideration has the stem armed with the leaves varying from oblong obtuse to spatulate. It resembles the form *carolensis* very much, (no. 1757). SEYMOUR ISL., SOUTH: occasional bushes. Stem unarmed, leaves similar to those described by Rob. l. c., (no. 1760).

Forma **duncanensis** Rob. (1), 159.—BARRINGTON ISL.: bushes with procumbent armed branches, leaves oblanceolate acute with revolute margins, .4-1 cm. long, (no. 1754). DUNCAN ISL.: prostrate bushes above 300 ft. The specimen is armed with very strong spines, leaves oblanceolate with margins strongly revolute, .9-1.6 cm. long. The type specimen is evidently a young branch, the leaves at the base of which tend to assume the revolute form. There is a single weak spine on the type specimen, (no. 1755). JERVIS ISL.: occasional prostrate bushes to 1050 ft. Stem armed, leaves attenuate obtuse, .6-1.9 cm. long, (no. 1756). There is much variation in the arming of the stems and in the size of the leaves in the specimens from the different islands, as well as in specimens from the same island. The specimen from Barrington has the largest leaves and spines intermediate in size, that from Duncan has the leaves intermediate in size and the largest spines, while the specimen from Jervis has the smallest spines. The most important character which the specimens from the different islands have in common is the procumbent habit.

Forma **jacobensis** Rob. (1), 159.—JAMES ISL.: James Bay, bushes 4-5 ft. high, fairly common below 300 ft. Stem armed, leaves broadly oblong obtuse to lance-oblong acute, with or without revolute margins on the same specimen, (no. 1761).

From the above it can be seen that if formal differences occur in this species, such differences are not confined to a single island, as it often happens that specimens from different parts of the same island show quite as marked variations as do specimens from different islands.

BURSERACEAE

Bursera L.

B. graveolens (HBK.) Trian. & Planch. Ann. Sci. Nat. 5, XIV. 303 (1872). *Elaphrium graveolens* HBK. Nov. Gen. & Sp. VII. 31 (1825). *B. graveolens* Trian. & Planch. l. c.; Rob. (1), 159.—ABINGDON ISL.: common trees to 1000 ft., below 400 ft. they are small and scattered, (no. 1762). ALBEMARLE ISL.: Banks Bay, common trees to 1700 ft., according to *F. X. Williams;* Cowley Bay, small trees above 400 ft., common trees, 3-4 inches in diameter and 12-15 ft. high, around 1200 ft., large spreading trees much infested with *Usnea longissima* above 2000 ft.; Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, occasional small trees to 400 ft. The small size and scarcity of this species here may be due to the more moist conditions which prevail, (no. 1765); Tagus Cove, common trees in tufaceous soil on the lower parts and on the sides of the mountain to 2000 ft.; Villamil, low spreading trees common to 550 ft. BARRINGTON ISL.: small trees, leafless in October and July, much infested with *Roccela peruensis.* BINDLOE ISL.: northeast side, common trees in tufaceous soil. CHARLES ISL.: common trees to 1000 ft. CHATHAM ISL.: Basso Point, common trees to above 1000 ft.; Sappho Cove, common trees to above 800 ft.; Wreck Bay, common trees to 700 ft. CULPEPPER ISL.: low spreading trees, apparently of this species, were seen around the top of the island. GARDNER ISL. (near HOOD ISL.): small trees all over the island (no. 1767). HOOD ISL.: trees 12-18 ft. high, common on all sides of the island except the south, where they seem to be rather scarce, (no. 1768). INDEFATIGABLE ISL.: Academy Bay, common trees to 350 ft. (no. 1769); north side, small trees and bushes on lava beds; northwest side, common trees to 750 ft., attaining their largest size around 600 ft.; southeast side, common trees below 500 ft. JAMES ISL.: James Bay, abundant below 1000 ft.;

north side, extending to above 1800 ft. according to *F. X. Williams.* JERVIS ISL.: small trees on the lower parts (no. 1771). NARBOROUGH ISL.: north side, small trees on lava beds (no. 1772). TOWER ISL.: small trees, much infested with lichens. This species forms one of the most common trees in the dry and transition regions on the islands where it occurs. It seldom attains a great height, usually having a broadly spreading crown and a short thick trunk. Its absence from Duncan Island is rather peculiar, as it is found on all of the adjacent islands, and the conditions here do not seem to be such as would inhibit its growth. Further distr. Mex., W. Ind., S. Am. to Peru.

B. malacophylla Rob. (1), 160.—SEYMOUR IDS., NORTH (?) and SOUTH: *Snodgrass and Heller.* At both the times our party visited south Seymour, viz. in July and November, the *Bursera* trees were out of foliage. So far as is known this species does not occur on the north side of Indefatigable although this island is separated from Seymour by a channel which is only about a half mile in width and is probably of comparatively recent origin. Endemic.

POLYGALACEAE

Polygala L.

P. Anderssonii Rob. (1), 160. *P. puberula* Anderss. (1), 232, (2), 100.—INDEFATIGABLE ISL.: northwest side, *Andersson; Baur.* Endemic.

P. galapageia Hook. f. (3), 233; Rob. (1), 160.—ABINGDON ISL.: fairly abundant on the lava beds on the lower parts (no. 1773). ALBEMARLE ISL.: Cowley Bay, not abundant (no. 1775); Tagus Cove, abundant from the beach to 600 ft. (no. 1774). BINDLOE ISL.: occasional in tufaceous soil near the shore (no. 1776). CHARLES ISL.: *Darwin; Andersson; Baur.* CHATHAM ISL.: Wreck Bay, abundant in sandy soil near the shore (no. 1777); north side, *Baur.* INDEFATIGABLE ISL.: north side, abundant in light ashy soil near the shore (no. 1778); northwest side, abundant in tufaceous soil near the shore (no. 1779). JAMES ISL.: northeast side, specimens seen at 200 ft. JERVIS ISL.: *Baur.* Endemic.

Var. **insularis** Rob. (1), 161. *P. obovata* Hook. f. (3), 233. —Albemarle Isl.: *Macrae.* Charles Isl.: Cormorant Bay, abundant on sand beaches (no. 1780). Chatham Isl.: Sappho Cove, abundant on sand beaches (no. 1782). Indefatigable Isl.: Academy Bay, common on the lower parts (no. 1783). James Isl.: northeast side. Jervis Isl.: *Baur.* Endemic.

EUPHORBIACEAE

Acalypha L.

A. Adamsii Rob. (1), 161.—Chatham Isl.: Wreck Bay, *Baur.* Endemic.

A. albemarlensis Rob. (1), 163.—Albemarle Isl.: Iguana Cove, occasional among dense vegetation at 300 ft. (no. 1784); Tagus Cove, *Snodgrass and Heller.* Endemic.

A. Baurii Rob. & Greenm. (1), 144, 148; Rob. (1), 163.—Albemarle Isl.: Villamil, common in open woodland at 1300 ft. (no. 1793). Chatham Isl.: Wreck Bay, *Baur.* Endemic.

A. chathamensis Rob. (1), 163.—Chatham Isl.: Basso Point, occasional among rocks at 800 ft. (no. 1785); Wreck Bay, *Snodgrass and Heller.* Endemic.

A. cordifolia Hook. f. (3), 186; Rob. (1), 163.—Charles Isl.: *Darwin.* Chatham Isl.: *Andersson.* Identity doubtful acc. to Rob. l. c. Endemic.

A. diffusa Anderss. (1), 240, (2), 104, t. 14, f. 4; Rob. (1), 163.—Albemarle Isl.: Cowley Bay, *Andersson.* Chatham Isl.: Wreck Bay, *A. Agassiz.* Endemic.

A. flaccida Hook. f. (3), 186; Rob. (1), 164.—James Isl.: *Darwin.* Endemic.

A. parvula Hook. f. (3), 185; Rob. (1), 164.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, common above 1500 ft. (no. 1786); Villamil, *Baur.* Charles Isl.: common in rather open brushy country around 1,100 ft. (no. 1787). Endemic.

A. reniformis Hook. f. (3), 187; Rob. (1), 164.—Charles Isl.: *Darwin.* Endemic.

A. sericea Anderss. (1), 238, (2), 103, t. 14, f. 1; Rob. (1), 164.—Abingdon Isl.: occasional to 500 ft., abundant above this elevation. The specimens from the different elevations are similar in the size of the leaves and in the pubescence, (nos. 1788-1791). Albemarle Isl.: *Andersson.* Bindloe Isl.: *Baur; Snodgrass and Heller.* Endemic.

A. spicata Anderss. (1), 239, (2), 104, t. 14, f. 3; Rob. (1), 164.—Albemarle Isl.: Iguana Cove, abundant on the sides of the cliff above the cove (no. 1792). Charles Isl.: occasional at sea level and at 1200 ft. (nos. 1794-1795). Chatham Isl.: north side, *Andersson.* Duncan Isl.: *Baur.* Gardner Isl. (near Hood Isl.): (no. 1796). Hood Isl.: rare around 300 ft. (no. 1797). Indefatigable Isl.: Academy Bay, occasional below 75 ft. (no. 1800); northwest side, occasional in tufaceous soil near the shore (no. 1799). Jervis Isl.: *Baur.* Endemic.

A. strobilifera Hook. f. (3), 187; Rob. (1), 164.—Albemarle Isl.: Cowley Bay, *Baur.* Chatham Isl.: north side, *Darwin; Andersson; Baur.* Endemic.

A. velutina Hook. f. (3), 186; Rob. (1), 164.—Charles Isl.: *Darwin; Andersson; Baur.* Chatham Isl.: Wreck Bay, common in open shady woods around 700 ft. (no. 1801). Endemic.

Var. **minor** Hook. f. (3), 187; Rob. (1), 165.—Charles Isl.: *Darwin; Baur.* Endemic.

A. sp.—Albemarle Isl.: Cowley Bay, occasional below 300 ft. Sterile and indeterminate, (no. 1802).

A. sp.—Indefatigable Isl.: north side, common at 250 ft. Indeterminate. Both of the above specimens probably belong to species already described from the islands.

A. sp. Rob. (1), 165. *A. parvula* var. *cordifolia* ? Rob. & Greenm. (1), 148.—Barrington Isl.: *Baur.* Endemic.

A. sp. Rob. (1), 165.—Barrington Isl.: *Snodgrass and Heller.* Endemic.

A. sp. Rob. (1), 165.—Barrington Isl.: *Baur.* Endemic.

A. sp. Rob. (1), 165.—Indefatigable Isl.: south of Conway Bay, *Baur.* Endemic.

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A. sp. Rob. (1), 165.—*A. parvula* var. *flaccida* Rob. & Greenm. (1), 148.—DUNCAN ISL.: *Baur.*

Croton L.

C. Scouleri Hook. f. (3), 188; Rob. (1), 165.—ALBEMARLE ISL.: Villamil, common bushes, 100-350 ft., (no. 1804). BARRINGTON ISL.: bushes 6-8 ft. high all over the island (no. 1805). BINDLOE ISL.: common bushes in tufaceous soil (no. 1806). BRATTLE ISL.: low bushes, nearly leafless in October, (no. 1807). CHARLES ISL.: *Snodgrass and Heller,* approaching var. *incanus* according to Rob. l. c. CHATHAM ISL.: north side, *Darwin; Baur.* HOOD ISL.: bushes 10 ft. and more in height all over the island (no. 1808). INDEFATIGABLE ISL.: Academy Bay, occasional bushes to 550 ft.; southeast side, common bushes all over the lower parts, (nos. 1809-1810). JAMES ISL.: *Douglas; Scouler; Andersson;* James Bay, *Snodgrass and Heller.* JERVIS ISL.: bushes 4-5 ft. high all over the island (nos. 1812-1814). NARBOROUGH ISL.: south side, *Snodgrass and Heller.* TOWER ISL.: *Baur.* Endemic.

Var. **albescens** Muell. Arg. in DC. Prodr. XV. pt. 2, 605 (1862); Rob. (1), 165.—ALBEMARLE ISL.: *Andersson;* Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, occasional bushes to 4000 ft. (no. 1816). BINDLOE ISL.: *Baur.* CHARLES ISL.: *Andersson; A. Agassiz.* CHATHAM ISL.: Basso Point, common bushes to above 900 ft. (no. 1819); Wreck Bay, small trees and bushes on the lower parts (nos. 1817-1818). INDEFATIGABLE ISL.: north side, bushes 6-7 ft. high at 300 ft. (no. 1820). JAMES ISL.: *Andersson;* northeast side, small bushes on lava beds (no. 1821). Endemic.

Forma **microphyllus** Muell. Arg. l. c.; Rob. (1), 166.—ALBEMARLE ISL.: *Andersson.* Endemic.

Var. **brevifolius** Muell. Arg. l. c. *C. brevifolius* Anderss. (1), 241, (2), 105. Var. *brevifolius* Muell. Arg. l. c.; Rob. (1), 166.—ABINGDON ISL.: common bushes 4-5 ft. high below 1000 ft. (no. 1822). ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller.* BINDLOE ISL.: common bushes (no. 1832). CHARLES ISL.: bushes rather characteristic of the region between 650 and 1100 ft. This species becomes more abundant with the increase in elevation and forms a belt, around the base of the central mountain, which is noticeable from Black Beach Road during the dry season when most of the other vegetation is leafless or has the leaves very much reduced, (nos. 1823-1824). CULPEPPER ISL.: *F. X. Williams,* collector. Croton bushes appear to be very abundant on the top of the island. GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: common bushes (no. 1826). INDEFATIGABLE ISL.: Academy Bay, occasional bushes and small trees 10-15 ft. high to 300 ft. (nos. 1828-1829); northwest side, bushes 6-10 ft. high (no. 1827). JAMES ISL.: James Bay, common bushes to 1000 ft. (no. 1830). SEYMOUR ISL., NORTH: *Snodgrass and Heller.* WENMAN ISL.: slender trees and bushes (no. 1833). Endemic.

Var. **glabriusculus** nov. var.

Foliis ovatis denticulatis acutis utrinque sparsim pubescentibus; pilis aliis simplicibus aliis stellatis lamina circa 4 cm. longa 2.4 cm. lata.

ABINGDON ISL.: small trees and bushes, 1000-1650 ft., (no. 1834). A variety closely related to var. *brevifolius,* differing in the slightly denticulate margins of the leaves and in the presence of simple trichomes. Endemic.

Var. **grandifolius** Muell. Arg. l. c.; Rob. (1), 166.—ABINGDON ISL.: bushes 6-10 ft. high, 1000-1650 ft., (no. 1835). ALBEMARLE ISL.: Villamil, bushes and small trees, abundant at 300-1300 ft., (no. 1836). It should be noted that *C. Scouleri* extends up to 350 ft., so there is a slight overlapping of the two forms. CHARLES ISL.: common bushes, 1000-1350 ft., (no. 1837). Var. *brevifolius* extends up to 1100 ft. here, and the leaves increase considerably in size with the elevation, so that there is a close resemblance between var. *grandifolius* and the more mesophytic form of var. *brevifolius.* CHATHAM ISL.: Wreck Bay, low bushes in open country around 700 ft. (no. 1838). JAMES ISL.: James Bay, small trees and bushes 6-12 ft. high above 1000 ft., very abundant in woodland around 2000 ft., (nos. 1839-1840). It should be noted again that the lower limit of this variety, at this place, is also about the upper limit of var. *brevifolius.* TOWER ISL.: *Snodgrass and Heller.* Endemic.

Var. **Macraei** Muell. Arg. l. c.; Rob. (1), 166.—ALBEMARLE ISL.: Cowley Bay, common bushes, 250-1300 ft., (no. 1842);

Tagus Cove, trees and bushes in tufaceous soil around the base of the mountain. In protected places in canyons it sometimes attains a height of over 20 ft. (no. 1841). CHARLES ISL.: low trees and bushes on the lower parts (no. 1843). INDEFATIGABLE ISL.: Academy Bay, bushes and small trees forming dense thickets in the vicinity of the shore (nos. 1844-1845); southeast side, bushes and small trees common below 500 ft. (no. 1846). JAMES ISL.: James Bay, *Andersson;* Orchilla Bay, *Baur.* Endemic.

Croton bushes form one of the most striking elements of the flora of the dry region and it is seldom that one can go very far away from the shore without encountering thickets of them. The bark is grayish white and the leaves grayish green in color, on most of the varieties found on the lower parts of the islands. The characteristically gray color of the vegetation in the dry regions is largely due to the number of these bushes.

In general *C. Scouleri* and the varieties *albescens* and *Macraei* are found in the dry regions, var. *brevifolius* in the transition region, and varieties *grandifolius* and *glabriusculus* in the moist regions, with occasional overlapping of the varieties as mentioned above.

Euphorbia L.

E. amplexicaulis Hook. f. (3), 183; Rob. (1), 166.—ABINGDON ISL.: occasional low shrubs near the shore (no. 1847). BINDLOE ISL.: low shrubs in tufaceous soil near the shore (no. 1848). BRATTLE ISL.: (no. 1849). CHATHAM ISL.: *Darwin.* DAPHNE ISL.: (no. 1851). GARDNER ISL. (near CHARLES ISL.): (no. 1850). INDEFATIGABLE ISL.: north side, common on sand beaches (no. 1852). JAMES ISL.: on a small islet about one-half mile off the northeast side (no. 1853). SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* TOWER ISL.: occasional low shrubs on the tops of cliffs (no. 1854). WENMAN ISL.: (no. 1855). This species is always found in close proximity to the shore. Endemic.

E. apiculata Anderss. (1), 234, (2), 101; Rob. (1), 166.—CHATHAM ISL.: *Andersson.* Endemic.

E. articulata Anderss. (1), 236, (2), 102, t. 12, f. 2; Rob. (1), 166.—ABINGDON ISL.: low bushes on lava beds on the lower parts of the island (no. 1856). ALBEMARLE ISL.:

Cowley Bay, common to 1200 ft. (no. 1857); Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, common in tufaceous soil to 600 ft. (no. 1858). Bindloe Isl.: low shrubs near the shore (nos. 1859-1860). Charles Isl.: common bushes in loose soil among rocks (nos. 1861-1863). Chatham Isl.: Sappho Cove, abundant in lava crevices near the coast (no. 1864); Wreck Bay, *A. Agassiz.* Indefatigable Isl.: northwest side, bushes 2-3 ft. high common below 250 ft. (no. 1865). James Isl.: northeast side, common near the shore (no. 1866); Orchilla Bay, *Baur.* Seymour Isl., south: *Snodgrass and Heller.* Endemic.

Var. **bindloensis** nov. var.; *E.* sp. aff. *E. articulata* Anderss.; Rob. (1), 169.

Foliis ovatis basi cordatis 5 mm. longis 3 mm. latis; ramulis rigidis divaricatis.

Abingdon Isl.: occasional low shrubs near the shore (no. 1867). Bindloe Isl.: low shrubs in tufaceous soil in the vicinity of the shore (no. 1868). Plate III, fig. 5. Endemic.

E. diffusa Hook. f. (3), 184; Rob. (1), 167.—Albemarle Isl.: Cowley Bay, *Andersson;* Tagus Cove, common in tufaceaus soil on the sides of the hills surrounding the cove (no. 1869). Chatham Isl.: Wreck Bay, in dry sandy soil near the shore (no. 1872). Duncan Isl.: occasional in protected places on the lower parts (no. 1870). Indefatigable Isl.: north side, *Snodgrass and Heller.* Jervis Isl.: *Baur.* Narborough Isl.: north side, abundant in lava crevices near the shore (no. 1871). Endemic.

E. equisetiformis, nov. sp.

Fruticosa glabra; caulibus erectis teretibus ramosis ad nodos perfragilibus; ramis ultimis in fasciculum ramulorum 2-3 pallido-viridum complanatorum terminantibus; foliis oppositis squamiformibus; involucris terminalibus solitariis rufo-bruneis brevipedunculatis bibracteatis; glandulis ellipticis appendiculas fimbriatas gerentibus; floribus masculis numerosis; squamis fimbriatis gracilibus truncatis numerosis; floribus femineis erectis, capsula obtuse angulata, involucro trilobato.

Albemarle Isl.: Villamil, occasional bushes 3-4 ft. high on the floor of the crater at 2750 ft. Most of the other vegetation in the vicinity is quite xerophytic in character, (no. 1873). Plate III, figs. 1-2. Endemic.

E. flabellaris Anderss. acc. to Boiss. in DC. Prodr. XV. pt. 2, 17 (1862); Rob. (1), 167.—Abingdon Isl.: *Snodgrass* *and Heller.* Albemarle Isl.: Iguana Cove, abundant on the sides of the cliffs above the cove (no. 1874). Barrington Isl.: *Snodgrass and Heller.* Identity doubtful acc. to Rob. l. c. Charles Isl.: *Darwin.* Chatham Isl.: Sappho Cove, occasional on the beach (no. 1876); Wreck Bay, occasional in open vegetation around 200 ft. (no. 1875). Gardner Isl. (near Hood Isl.): common in loose soil mixed with small particles of lava (no. 1878). Indefatigable Isl.: northwest side (no. 1879). James Isl.: James Bay, *Snodgrass and Heller.* Identity doubtful acc. to Rob. l. c. Seymour Isl., north: *Snodgrass and Heller.* Endemic.

E. galapageia Rob. & Greenm. (1), 144, 148; Rob. (1), 167. —Charles Isl.: *Baur.* Endemic.

E. nesiotica Rob. (1), 167.—Seymour Isl., south: *Snodgrass and Heller.* Endemic.

E. nummularia Hook. f. (3), 183; Rob. (1), 168.—Chatham Isl.: north side, *Andersson; Baur;* Wreck Bay, common in dry sandy soil near the shore (nos. 1880-1881). Endemic.

Var. **glabra** Rob. & Greenm. (1), 144, 148; Rob. (1), 168. —Charles Isl.: procumbent shrubs among rocks near the shore (no. 1882); Cuevas Bay, *Baur.* Endemic.

E. pilulifera L. Amoen. Acad. III. 115 (1756); Rob. (1), 168.—Charles Isl.: abundant in open places near the shore, occasional in rather open brushy country around 900 ft., rare in meadows around 1000 ft., abundant on the sides of the main mountain at 1250 ft. The specimen from the upper elevation is larger and less pubescent than the specimens taken lower down, (nos. 1883-1886). Chatham Isl.: Wreck Bay, abundant in dry sandy soil near the beach (no. 1887). James Isl.: *Darwin.* Further distr. general in warm countries.

E. punctulata Anderss. (1), 235, (2), 102; Rob. (1), 168. —Albemarle Isl.: Cowley Bay, *Andersson.* Duncan Isl.: *Baur.* Hood Isl.: *Baur.* Endemic.

E. recurva Hook. f. (3), 182; Rob. (1), 168.—Chatham Isl.: north side, *Darwin; Andersson.* Endemic.

E. Stevensii nov. sp.

Caulibus erectis gracilibus teretibus glaberrimis; ramis divaricatis teretibus glaberrimis vel subtiliter pubescentibus; foliis oppositis lanceolatis acutis basi obliquo-cordatis integerrimis vel crenatis supra pallido-viridibus subtus albidis utrinque glaberrimis pellucido-maculatis breviter petiolatis, laminis 1.9 cm. longis, 4.5 mm. latis; floribus axillaribus 3-umbellatis breviter pedunculatis; glandulis 4 nigris inappendiculatis; capsula 3 cocca parva puberula longipedunculata nutante acute angulata; seminibus subrufescentibus 4-angulatis rugulosis. Differs from *E. cumbrae* Boiss. in the pellucidly marked leaves, the black involucral glands, and the puberulent capsule; otherwise very similar.

ABINGDON ISL.: occasional at 1100 ft. (no. 1888). ALBEMARLE ISL.: Iguana Cove, occasional in shady places (no. 1890, type); Tagus Cove, common in moist shady places at the summit of the mountain, 4000 ft., (no. 1889). Plate II, figs. 3-4. Endemic.

E. thymifolia L. Sp. Pl. 454 (1753).—DUNCAN ISL.: occasional in moist vegetable mold at 1250 ft. (no. 1891). Further distr. tropics of both hemispheres.

E. viminea Hook. f. (3), 184; Rob. (1), 168.—ALBEMARLE ISL.: Cowley Bay, one of the most abundant bushes above 1200 ft. (no. 1899); Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, bushes 2-3 ft. high, abundant on beds of basaltic lava below 100 ft., (no. 1892). BINDLOE ISL.: common everywhere, very abundant on exposed tufa ridges in the interior of the island below 500 ft., (no. 1896). INDEFATIGABLE ISL.: north side, low and somewhat procumbent bushes in lava crevices in the vicinity of the shore (no. 1895); southeast side, bushes 3-5 ft. high, forming tangled thickets around 450 ft., (no. 1894). Endemic.

Forma **barringtonensis** Rob. & Greenm. (1), 139; Rob. (1), 168.—BARRINGTON ISL.: bushes about 3 ft. high, common on flat areas in the interior of the island. The specimen is too poor for accurate determination, (no. 1897). BINDLOE ISL.: *Baur; Snodgrass and Heller.* Endemic.

Forma **carolensis** Rob. & Greenm. (1), 139; Rob. (1), 168.—CHARLES ISL.: common bushes around 625 ft., (no. 1898). Endemic.

Forma **castellana** Rob. & Greenm. (1), 138; Rob. (1), 168.—ABINGDON ISL.: bushes 2-3 ft. high, common on lava beds to 800 ft., (nos. 1899-1900). GARDNER ISL. (near HOOD ISL.): low bushes among rocks near the shore (no. 1901). TOWER ISL.: low spreading bushes common everywhere (no. 1902). Endemic.

Forma chathamensis Rob. & Greenm. (1), 138; Rob. (1), 168.—CHATHAM ISL.: Basso Point, spreading bushes on lava fields near the coast (no. 1903); Wreck Bay, common bushes on sand beaches (no. 1904). Endemic.

Forma **jacobensis** Rob. & Greenm. (1), 138; Rob. (1), 169. —JAMES ISL.: Orchilla Bay, *Baur.* Endemic.

Forma **jervensis** Rob. & Greenm. (1), 139; Rob. (1), 169. —JERVIS ISL.: occasional low bushes on the sides of the island, and around the top at 1050 ft., (no. 1905). Endemic.

Var. **abingdonensis** Rob. & Greenm. (1), 139; Rob. (1), 169. —ABINGDON ISL.: *Baur.* Endemic.

E. sp.—CHARLES ISL.: Post Office Bay, occasional below 300 ft. (no. 1906). Probably endemic.

E. sp. Hook. f. (3), 185; Rob. (1), 169.—CHARLES ISL.: *Darwin.*

E. sp. Anderss. (1), 237, (2), 102; Rob. (1), 169.—CHATHAM ISL.: *Andersson.*

Hippomane L.

H. Mancinella L. Sp. Pl. 1191 (1753); Rob. (1), 169.—ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Cape Rose, common in the vicinity of the shore; Iguana Cove, a few small trees at the end of the cove; Turtle Cove, low spreading trees near the shore; Villamil, islands of low spreading trees in the vicinity of the shore; in low areas, some distance back from the shore, the soil of which is kept constantly moist by telluric waters; and forming a belt of low trees in a rather dense forest of *Sapindus Saponaria* trees around 600 ft. No connection was found between the lower and upper belts of this species and so far as is known the lower belt ends a very little above sea level. CHARLES ISL.: a few trees on a sand beach (no. 1907). CHATHAM ISL.: Sappho Cove, dense groves of rather small trees in the interior; Wreck Bay, common trees in low places around 200 ft., and also in open forests around 700 ft., (no. 1908). INDEFATIGABLE ISL.: Academy Bay, a few trees in sandy soil near the shore; southeast side, low dense groves around brackish lagoons (no. 1909). JAMES

Isl.: James Bay, fringing a crater lake, south of the bay, the water of which is so saturated that a layer of pure white salt has crystallized out on the bottom; also occasional on the mountain side at 900 ft., (no. 1910).

From the above it is seen that this tree is found under the most varied conditions, from halophytic to mesophytic, without any perceptible change in its general appearance. In many respects it is a very unpleasant tree with which to come in contact. The milky sap has a very strong peppery taste and will blister the parts which it touches, if not soon removed. It is also very unpleasant, and in fact dangerous, to be under these trees during a rain, for if the water from the leaves gets into one's eyes, the sensation is very painful and the pain lasts for a considerable time. The fruit has a very pleasant odor when ripe, and resembles a small yellow apple in size and color, but it is extremely poisonous, according to the inhabitants of the islands. The tortoises around Cape Rose, Albemarle Island, eat the fruit in great quantity; but we found in cleaning some of these tortoises for specimens, that this diet had weakened the tissues of the alimentary canal greatly. But little vegetation is found under the trees of this species, as a rule, a condition which is probably brought about by the dense shade. Further distr. S. U. S., Mex., W. Ind., N. S. Am.

Jatropa L.

J. curcas L. Sp. Pl. 1006 (1753).—Charles Isl.: near former habitations and probably introduced (no. 1913). Widely distributed in tropical regions.

Manihot Adans.

M. utilissima Pohl. Pl. Bras. Ic. I. 32, t. 24 (1827); Rob. (1), 169.—Albemarle Isl.: Villamil, in gardens (no. 1911). Charles Isl.: *Chierchia.* Indefatigable Isl.: northwest side, a few specimens at 750 ft. (no. 1912). No doubt an introduced species. Widely distributed in tropical regions.

Phyllanthus L.

P. carolinensis Walt. Fl. Car. 228 (1788); Rob. (1), 169.—Abingdon Isl.: occurs first at 725 ft., common above 1000 ft., (no. 1914). Albemarle Isl.: Cowley Bay, common in woodland above 2000 ft.; Iguana Cove, abundant on side of cliff above the cove; Tagus Cove, *Snodgrass and Heller;* Villamil, common in the moist region above 400 ft. and on the rim of the crater at 3150 ft. The specimens from the rim of the crater have smaller leaves than do the specimens collected lower down, (nos. 1915, 1917-1919). Charles Isl.: occasional around 1700 ft. Chatham Isl.: Wreck Bay, fairly abundant in the grassy region above 900 ft. during the rainy season (nos. 1920-1921). Duncan Isl.: occasional in moist shady places among rocks at 1300 ft. (no. 1922). James Isl.: James Bay, *Snodgrass and Heller.* Narborough Isl.: north and south sides, *Snodgrass and Heller.* Further distr. S. U. S., Mex., W. Ind., northern S. Am.

Ricinus L.

R. communis L. Sp. Pl. 1007 (1753); Rob. (1), 170.—Charles Isl.: *Andersson.* Chatham Isl.: Wreck Bay, around habitations, probably introduced. Widely distributed.

CALLITRICHACEAE

Callitriche L.

C. sp. Wolf, (1), 284; Rob. (1), 170.—Charles Isl.: in a brook near the hacienda, according to *Wolf.* Probably around 1000 ft. elevation.

CELASTRACEAE

Maytenus Feuill.

M. obovata Hook. f. (3), 230; Rob. (1), 170.—Albemarle Isl.: Cowley Bay, occasional bushes near the beach; Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, *Snodgrass and Heller;* Tagus Cove, common bushes on the lower parts and on the sides of the mountain, occasional at 4000 ft.; Villamil, common bushes below 300 ft. (no. 1928). Barrington Isl.: low bushes in the vicinity of the shore (no. 1925). Charles Isl.: common bushes in the vicinity of the shore, occasional as high as 1000 ft. The specimens from around the upper limit of distribution have much larger leaves than do the specimens taken near the shore, (nos. 1925-1926). Chatham Isl.:

Basso Point, common bushes to above 900 ft. (no. 1929); Wreck Bay, common bushes to 700 ft. The leaves are much larger on the specimens taken at 700 ft. than on the specimens from near the shore. Duncan Isl.: occasional procumbent bushes at 1000 ft. Bushes small and with leaves reduced in size. Gardner Isl. (near Hood Isl.): common bushes. Hood Isl.: common bushes on sand beaches, and occasional bushes all over the island, (no. 1927). Indefatigable Isl.: Academy Bay, common bushes near the shore, small trees around 450 ft.; north side, common on sand beaches. The roots of many of these bushes are in contact with the sea water at high tide, and when found under such conditions the trunks are usually short and much twisted, while the leaves are more succulent than on specimens taken further away from the shore. James Isl.: James Bay, common in sandy soil around salt lagoons, sometimes forming trees 25-30 ft. in height; northeast side, common bushes on sand beaches and around salt lagoons. Jervis Isl.: bushes 5-7 ft. high near the shore, low procumbent bushes around 1050 ft. Narborough Isl.: *Snodgrass and Heller.* Seymour Isl., south: abundant in thickets with *Discaria pauciflora* in sandy soil near the shore. Endemic.

SAPINDACEAE

Cardiospermum L.

C. Corindum L. Sp. Pl. ed. 2, 526 (1762); Rob. (1), 170.—Albemarle Isl.: Cowley Bay, around 1450 ft.; Elizabeth Bay, *Snodgrass and Heller.* Charles Isl.: *Andersson.* Chatham Isl.: Basso Point, common at 900 ft. (nos. 1933-1934); Wreck Bay, common at 700 ft. Duncan Isl.: covering rocks and bushes at 1300 ft. (no. 1935). Indefatigable Isl.: north side, on rocks and trees at 250 ft. (no. 1936); northwest side, occasional at 200 ft. James Isl.: James Bay, *Andersson; Snodgrass and Heller.* Wenman Isl.: on the upper parts, *R. H. Beck* collector. Further distr. S. W. U. S., Mex., W. Ind., S. Am.

C. galapageium Rob. & Greenm. Proc. Am. Acad. XXXII. 38 (1896); Rob. (1), 171.—Albemarle Isl.: Villamil, very abundant on bushes near sea level (no. 1938). Indefatigable Isl.: Academy Bay, common near sea level (no. 1940); southeast side, on rocks and bushes at 600 ft. (no. 1939). JAMES ISL.: James Bay, abundant below 1300 ft. Endemic.

Dodonaea L.

D. viscosa Jacq. Enum. Pl. Carib. 19 (1762); Rob. (1), 171.—ALBEMARLE ISL.: Cowley Bay, low bushes in disintegrated pumice near the shore (no. 1943); Villamil, occasional bushes on lava beds below 100 ft. (no. 1942). JAMES ISL.: James Bay, occasional bushes 4-5 ft. high on basaltic lava at 850 ft. (no. 1944). Further distr. general in warm countries.

Var. **spathulata** Benth. Fl. Aust. I. 476 (1863); Rob. (1), 171.—ALBEMARLE ISL.: Cowley Bay, small trees and bushes around 1800 ft. (no. 1946); Tagus Cove, bushes 4-5 ft. high, abundant on lava beds above 2000 ft., (no. 1945). There are occasional clumps of bushes, which apparently belong to this species, on the floor of the crater. Further distr. general in warm countries.

Sapindus L.

S. Saponaria L. Sp. Pl. 367 (1753); Rob. (1), 171.—ALBEMARLE ISL.: Villamil, forest trees, abundant at 350-700 ft., scattering specimens to 1300 ft. The largest forest tree found on the islands, (no. 1947). Further distr. S. U. S., Mex., W. Ind., S. Am.

RHAMNACEAE

Discaria Hook.

D. pauciflora Hook. f. (3), 229; Rob. (1), 171.—ALBEMARLE ISL.: Cowley Bay, occasional bushes from the shore to 1300 ft.; Elizabeth Bay, *Snodgrass and Heller;* Cape Rose, occasional low bushes; Tagus Cove, occasional bushes near the coast; Villamil, common bushes on the lower parts. BARRINGTON ISL.: common bushes near the shore (no. 1949). CHARLES ISL.: common bushes near the beach (no. 1951). CHATHAM ISL.: Basso Point, common bushes to 900 ft.; Wreck Bay, abundant near the shore, occasional at 900 ft., (no. 1952). DUNCAN ISL.: procumbent bushes at 700 ft. HOOD ISL.: common bushes on sand beaches. The spines are unusually large and the leaves reduced on the specimens taken at this place, (no. 1950). INDEFATIGABLE ISL.: north side, *Snodgrass and Heller;* southeast side, common bushes on the lower parts, especially abundant in gullies and small canyons, where they often form impenetrable thickets. JAMES ISL.: James Bay, common bushes to 1350 ft. JERVIS ISL.: abundant near the shore, occasional at 1050 ft. On the upper part of the island the branches are procumbent, the spines short and weak, and the leaves rather large, (no. 1954). SEYMOUR ISL., NORTH: *Snodgrass and Heller;* SOUTH: common in thickets of *Maytenus obovata* bushes. Further distr. Ecuador.

VITACEAE

Cissus L.

C. sicyoides L. Syst. Nat. ed. 10, 897 (1760); Rob. (1), 172.—ALBEMARLE ISL.: Iguana Cove, common on rocks near the shore (no. 1955); Villamil, rare on the trunks of trees at 600 ft. (no. 1956). BINDLOE ISL.: *Snodgrass and Heller.* CHARLES ISL.: common on moist rocks at 1000 ft. (nos. 1957-1958). NARBOROUGH ISL.: *Snodgrass and Heller.* Further distr. Mex., W. Ind., S. Am.

Vitis L.

V. vinifera L. Sp. Pl. 202 (1753); Rob. (1), 172.—CHARLES ISL.: *Chierchia.* Further distr. Old World.

TILIACEAE

Corchorus L.

C. pilobolus Link, Enum. Hort. Berol. II. 72 (1822); Rob. (1), 172.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller.* CHARLES ISL.: occasional in dry ashy soil at 1200 ft. (no. 1959). GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* Further distr. Mex., W. Ind., S. Am.

Triumfetta L.

T. semitriloba Jacq. Enum. Pl. Carib. 22 (1762); Rob. (1), 172.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Turtle Cove, fruit of a Triumfetta was found attached to the hair of a cow killed by a member of the party in this vicinity. It probably belongs to this species. Widely distributed in warm countries.

MALVACEAE

Abutilon Gaertn.

A. depauperatum (Hook. f.) Anderss. (1), 230, (2), 98. *Sida depauperata* Hook. f. (3), 232. *A. Anderssonianum* Garcke in Anderss. (1), 230, (2), 98, t. 15, f. 1; Rob. (1), 173.—ABINGDON ISL.: occasional low bushes around 650 ft. (no. 1960). ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller*. The sterile specimen collected at this place by *Snodgrass and Heller* and called *Sida cordifolia* by Robinson l. c. no doubt belongs to this species; Tagus Cove, low bushes around the base of the mountain at 200 ft.; Villamil, common bushes below 500 ft. (no. 1961). BARRINGTON ISL.: *Snodgrass and Heller*. BINDLOE ISL.: *Snodgrass and Heller*. CHARLES ISL.: bushes 2-3 ft. high around 450 ft. (no. 1962). CHATHAM ISL.: Wreck Bay, bushes 2-3 ft. high in shady places around 300 ft. (nos. 1963-1964). DUNCAN ISL.: occasional low shrubs at 1300 ft. (no. 1965). GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller*. HOOD ISL.: common bushes in the interior of the island (no. 1966). INDEFATIGABLE ISL.: north side, *Snodgrass and Heller*. TOWER ISL.: occasional bushes (no. 1967). The principal differences between this species and *A. Anderssonianum*, as given by Garcke l. c., are the number of carpels, the number of seeds in each, and the shape of the lobes of the calyx. One specimen in the collection has seven carpels, which is intermediate in number between the two species, and there is considerable variation in the shape of the calyx lobes throughout. The fact that *A. depauperatum* has 3-5 seeds in a carpel, and *A. Anderssonianum* always 3, is hardly sufficient ground for the formation of two distinct species. It is likely that the specimens described as *A. Anderssonianum* are more mesophytic than the typical *A. depauperatum*. Endemic.

A. crispum (L.) Medic. Malv. 29 (1787). *Sida crispa* L. Sp. Pl. 685 (1753).—CHAMPION ISL.: *J. R. Slevin* collector (no. 1971). CHARLES ISL.: occasional at 450 ft. (nos. 1972-1973). DAPHNE ISL.: (no. 1970). Further distr. tropical regions.

A. sp.—INDEFATIGABLE ISL.: Academy Bay, occasional low bushes on the lower parts of the island, differing from *A. de-*

pauperatum in having the stem and leaves covered with a dense white tomentum. The specimen is sterile, (no. 1968).

A. sp.—INDEFATIGABLE ISL.: northeast side, sterile and indeterminate (no. 1969).

Anoda Cav.

A. hastata Cav. Diss. I. 38, t. 11, f. 2 (1790); Rob. (1), 173.—CHARLES ISL.: fairly common in open meadows around 1200 ft. (nos. 1974-1975). Further distr. U. S., Mex., W. Ind., S. Am.

Bastardia HBK.

B. viscosa (L.) HBK. Nov. Gen. & Sp. V. 256 (1821). *Sida viscosa* L. Syst. ed. 10, 1145 (1760). *B. viscosa* HBK. l. c.; Rob. (1), 173.—ABINGDON ISL.: common in open brushy country around 600 ft. (no. 1976). ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller.* CHATHAM ISL.: Basso Point, abundant to above 900 ft. (no. 1977). DUNCAN ISL.: occasional low bushes all over the lower parts of the island (nos. 1979-1980). HOOD ISL.: on the margin of a dried lake in the interior of the island and at 600 ft. (nos. 1981-1982). INDEFATIGABLE ISL.: Academy Bay, occasional at 100 ft. (no. 1985); north side, common above 100 ft. (no. 1986); northeast side, (no. 1984); northwest side, bushes 2-3 ft. high in tufaceous soil near the shore. JAMES ISL.: James Bay, low bushes to 1000 ft. (no. 1987). Further distr. Mex., W. Ind., S. Am.

Gossypium L.

G. barbadense L. Sp. Pl. 693 (1753); Rob. (1), 173.—ABINGDON ISL.: occasional bushes on the lower parts (no. 1989). ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, common bushes in the flat country around the base of the mountain and in deep canyons on its sides (no. 1990). BARRINGTON ISL.: *Baur.* CHARLES ISL.: *Andersson; Snodgrass and Heller.* CHATHAM ISL.: north side, *Darwin; Baur;* Wreck Bay, common bushes to 550 ft., very abundant in rocky soil in the vicinity of the shore. DUNCAN ISL.: bushes, 100-1300 ft., (no. 1993). GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: common bushes to 450 ft. (nos. 1994-1995). INDEFATIGABLE ISL.: southeast side, common bushes to 625 ft. (no. 1996). JAMES ISL.: *Darwin.*

JERVIS ISL.: occasional bushes (no. 1998). SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* Further distr. general in tropics.

G. Klotzschianum Anderss. (1), 228, (2), 97; Rob. (1), 174.—ALBEMARLE ISL.: Cowley Bay, *Andersson.* BINDLOE ISL.: *Snodgrass and Heller.* CHARLES ISL.: *Andersson.* CHATHAM ISL.: north side, *Andersson.* INDEFATIGABLE ISL.: Academy Bay, bushes on the lower parts of the island (no. 1999); north side, *Snodgrass and Heller.* Endemic.

Hibiscus L.

H. diversifolia Jacq. Col. Bot. II. 307 (1788).—CHATHAM ISL.: Wreck Bay, bushes 3-4 ft. high on north hill-side at 2000 ft. (nos. 2000-2001). Further distr. Mex., tropics of Old World.

H. Manihot L. Sp. Pl. 696 (1753).—ALBEMARLE ISL.: Villamil, around habitations. Called *"Saibo"* by the inhabitants, and probably introduced, (no. 2002). Further distr. Mex., Old World.

H. tiliaceus L. Sp. Pl. 694 (1753); Rob. (1), 174.—ALBEMARLE ISL.: Turtle Cove, low spreading trees near the beach (no. 2003). CHARLES ISL.: *Edmonston.* INDEFATIGABLE ISL.: Academy Bay, low trees near the beach (no. 2004). Further distr. general in tropics.

Malachra L.

M. capitata L. Syst. ed. 12, 458 (1767); Rob. (1), 174.—JAMES ISL.: *Darwin.* Further distr. general in tropical regions.

Malvastrum A. Gray

M. americanum (L.) Torr. Bot. Mex. Bound. 38 (1859). *Malva americanum* L. Sp. Pl. 776 (1753). *Malvastrum tricuspidatum* A. Gray. Pl. Wright, I. 16 (1852).—CHARLES ISL.: abundant in rather open bushy country around 800 ft., in meadows at 1100 ft., and on the sides of the main mountain at 1750 ft., (nos. 2005-2008). CHATHAM ISL.: Wreck Bay, common in woodland, 400-500 ft., (nos. 2009-2010). Further distr. general in tropical regions.

M. spicatum (L.) A. Gray, Mem. Am. Acad. N. S. IV. 22 (1849). *Malva spicata* L. Syst. ed. 10, 1146 (1760).—Chatham Isl.: Wreck Bay, occasional bushes, 250-450 ft., (nos. 2011-2013). Indefatigable Isl.: southeast side, occasional low bushes around 600 ft. (nos. 2014-2015). Further distr. general in tropical regions.

Sida L.

S. acuta Burm. var. **carpinifolia** K. Schum. in Mart. Fl. Bras. XII. pt. 3, 326 (1891); Rob. (1), 174.—Charles Isl.: *Andersson.* Further distr. general in tropical regions.

S. paniculata L. Syst. ed. 10, 1145 (1760); Rob. (1), 175.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller.* Charles Isl.: common above 450 ft. during the rainy season, in February and March; at other times it was not seen below 1000 ft., (nos. 2016-2018). Chatham Isl.: Wreck Bay, abundant in rather moist places (no. 2019). Further distr. Mex., W. Ind., S. Am.

S. rhombifolia L. Sp. Pl. 684 (1753); Rob. (1), 175.—Charles Isl.: *Edmonston; Lee; Snodgrass and Heller.* Chatham Isl.: Wreck Bay, common in woodland at 300-450 ft., and in open country around 900 ft., (nos. 2020-2022). Further distr. general in warm countries.

S. spinosa L. Sp. Pl. 683 (1753); Rob. (1), 175. *S. angustifolia* Lam. Dict. I. 4 (1783); Rob. (1), 175.—Abingdon Isl.: occasional around 1100 ft. (no. 2023). Albemarle Isl.: Cowley Bay, common in pumice soil around 1800 ft. (no. 2028); Iguana Cove, common on sides of cliff above the cove and occasional in woodland at 300 ft. (nos. 2024-2025); Tagus Cove, common in tufaceous soil on the lower parts (no. 2029); Villamil, common above 500 ft. (no. 2027). Charles Isl.: occasional in open country around 450 ft. (nos. 2030-2031). Chatham Isl.: Basso Point, (no. 2032); Wreck Bay, rare near the shore (no. 2033). Duncan Isl.: common among rocks at 1000 ft. (no. 2034). Gardner Isl. (near Hood Isl.): *Snodgrass and Heller.* Indefatigable Isl.: northwest side, rare in tufaceous soil near the shore (no. 2035). James Isl.: *Darwin.* Narborough Isl.: north side, common in lava crevices (no. 2036). Further distr. general in warm countries.

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S. supina L'Hér. Stirp. Nov. 109bis t. 52 (1785).—ABINGDON ISL.: common above 1000 ft. (no. 2037). ALBEMARLE ISL.: Tagus Cove, common, 1000-4000 ft., (nos. 2038-2041); Villamil, common in woodland, 500-1300 ft., (no. 2039). CHARLES ISL.: occasional in open country around 1000 ft. (no. 2042). DUNCAN ISL.: rare at 1250 ft. (no. 2043). Further distr. S. U. S., Mex., W. Ind., S. Am.

S. veronicaefolia Lam. var. **humilis** (Cav.) K. Schum. in Mart. Fl. Bras. XII. pt. 3, 320 (1891). *S. humilis* Cav. Diss. V. 277, t. 134, f. 2 (1788). Var. *humilis* K. Schum. l. c.; Rob. (1), 176.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller.* Further distr. general in warm countries.

Malvacea sp.—ABINGDON ISL.: common in woodland above 1000 ft. Specimen sterile and indeterminate (no. 2044).

STERCULIACEAE

Waltheria L.

W. reticulata Hook. f. (3), 231; Rob. (1), 176.—ABINGDON ISL.: bushes, usually procumbent, to 1100 ft., (no. 2045). ALBEMARLE ISL.: Cowley Bay, occasional procumbent bushes on the lower parts, common bushes 2-4 ft. high around 2,000 ft., (no. 2046); Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, bushes 2-4 ft. high, 300-600 ft., (no. 2047); Villamil, common bushes on lava beds to 200 ft. (no. 2048). CHARLES ISL.: *Andersson; Baur.* DUNCAN ISL.: low bushes at 1275 ft. (no. 2049). JAMES ISL.: *Douglas; Macrae;* James Bay, *Snodgrass and Heller.* JERVIS ISL.: occasional bushes at 350 ft. (no. 2051). Endemic.

Forma **Anderssonii** Rob. (1), 176. Forma *acamata* Rob. (1), 176.—BARRINGTON ISL.: *Baur.* CHATHAM ISL.: north side, *Andersson.* INDEFATIGABLE ISL.: north side, low bushes above 100 ft. (no. 2063); northeast side, low bushes near the coast (no. 2052). NARBOROUGH ISL.: north side, *Snodgrass and Heller.* TOWER ISL.: procumbent bushes, common, (no. 2053). The more abundant material seems to show that the characters which distinguish forma *acamata,* Rob. l. c., apply equally well to specimens of forma *Anderssonii,* on which account the two forms should probably be considered as one. Endemic.

Forma **intermedia** Rob. (1), 177.—ABINGDON ISL.: *Snodgrass and Heller.* ALBEMARLE ISL.: Iguana Cove, bushes 6-10 ft. high at 300 ft. (no. 2054). BINDLOE ISL.: low bushes in tufaceous soil (no. 2055). CHARLES ISL.: common bushes at 600 ft. (no. 2056); Cuevas Bay, *Baur.* CHATHAM ISL.: Basso Point, low spreading bushes on recent lava flows (no. 2057). GARDNER ISL. (near HOOD ISL.): common bushes 3-4 ft. high, sometimes procumbent, (no. 2062). INDEFATIGABLE ISL.: Academy Bay, occasional low bushes on the lower parts, (no. 2059); northwest side, common bushes to 750 ft.; southeast side, common bushes to 650 ft. JAMES ISL.: James Bay, bushes 5-7 ft. high to 1300 ft. (no. 2060). NARBOROUGH ISL.: north side, common bushes on lava near the coast (no. 2061). Endemic.

HYPERICACEAE

Hypericum L.

H. thesiifolium HBK. Nov. Gen. & Sp. V. 192 (1821).—ALBEMARLE ISL.: Villamil, common in loose ashy soil on the rim of the crater at 3150 ft., also found occasionally on the floor of the crater at 2750 ft. (nos. 2064-2065). CHATHAM ISL.: Wreck Bay, in dry exposed places at 1700 ft. (no. 2066). Further distr. Mex., S. Am.

TURNERACEAE

Turnera L.

T. ulmifolia L. Sp. Pl. 271 (1753); Rob. (1), 177.—CHARLES ISL.: *Edmonston.* Further distr. general in warm countries.

PASSIFLORACEAE

Passiflora L.

P. foetida L. Sp. Pl. 959 (1753); Rob. (1), 177.—ALBEMARLE ISL.: Tagus Cove, on the lower parts of the island and on the side of the mountain at 2800 ft. (no. 2067); Turtle

Cove, in open places along the beach (no. 2069); Villamil, abundant on rocks near the shore (no. 2068). Charles Isl.: common to 1200 ft. (nos. 2070-2071). Chatham Isl.: Wreck Bay, common on bushes and rocks on the lower parts of the island (no. 2072). Indefatigable Isl.: Academy Bay, covering bushes near the beach (no. 2073). Further distr. S. U. S., Mex., W. Ind., S. Am.

P. leariloba Hook. f. (3), 222; Rob. (1), 177.—Albemarle Isl.: Tagus Cove, occasional among rocks, 400-2000 ft., (no. 2074). Charles Isl.: *Darwin?; Andersson.* Gardner Isl. (near Hood Isl.): (no. 2075). Hood Isl.: on trunks of *Opuntia galapageia* at 450 ft. (no. 2076). Indefatigable Isl.: southeast side, occasional at 600 ft. (no. 2077). James Isl.: James Bay, common on bushes on the lower parts (no. 2078). Narborough Isl.: *Snodgrass and Heller.* Endemic.

P. subrosa L. Sp. Pl. 958 (1753). *P. puberula* Hook. f. (3), 223; Andersson (1), 221, (2), 93; Rob. (1), 177.—Abingdon Isl.: common in the moist region (no. 2079). Albemarle Isl.: Villamil, on rocks and bushes near sea level (no. 2080). Chatham Isl.: Wreck Bay, occasional, 400-650 ft., (no. 2081). Duncan Isl.: on rocks at 1275 ft. (no. 2082). James Isl.: *Darwin.* Further distr. S. U. S., Mex., W. Ind., S. Am.

CARICACEAE

Carica L.

C. Papaya L. Sp. Pl. 1036 (1753); Rob. (1), 178.—Albemarle Isl.: Villamil, around habitations in the region adjacent to the shore. Charles Isl.: around former habitations. Chatham Isl.: Wreck Bay, in gardens. Introduced into the islands. Further distr. general in the tropics.

LOASACEAE

Mentzelia L.

M. aspera L. Sp. Pl. 516 (1753); Rob. (1), 178.—Albemarle Isl.: Iguana Cove, common on bluff above the cove (no. 2083); Tagus Cove, common in shady places in tufaceous soil to 1000 feet. (no. 2084). CHARLES ISL.: common in open places among rocks near the shore (no. 2085); Cuevas Bay, *Baur;* CHATHAM ISL.: north side, *Andersson;* Wreck Bay, rare on sand beaches (no. 2086). DUNCAN ISL.: *Snodgrass and Heller.* GARDNER ISL. (near HOOD ISL.): *Snodgrass and Heller.* HOOD ISL.: *Snodgrass and Heller.* INDEFATIGABLE ISL.: Academy Bay, common in lava crevices near sea level (no. 2087); north side, *Snodgrass and Heller.* JAMES ISL.: *Andersson;* James Bay, *Snodgrass and Heller.* TOWER ISL.: *Snodgrass and Heller.* Further distr. U. S., Mex., W. Ind., S. Am.

Sclerothrix Presl

S. fasciculata Presl, Symb. Bot. II. 3, t. 53 (1858); Rob. (1), 178.—ALBEMARLE ISL.: Iguana Cove, (no. 2089); Tagus Cove, abundant at 4000 ft. (no. 2088). JAMES ISL.: James Bay, *Snodgrass and Heller.* NARBOROUGH ISL.: south side, *Snodgrass and Heller.* Further distr. Mex., S. Am.

CACTACEAE

Cereus Mill.

C. galapagensis Weber, Bull. du Mus. d'Hist. Nat. Paris 1899, 312 (1899); Rob. (1), 179. *C. Thouarsii* Weber, l. c. 312; Rob. (1), 180.—CHARLES ISL.: common in the vicinity of the shore (no. 2090). CHATHAM ISL.: Basso Point, occasional specimens were seen up to 800 ft.; Sappho Cove, grows very abundantly on the recent lava beds between the cove and Finger Point, as well as on the older lava on the east side of the cove, where it occurs abundantly in forests of *Bursera graveolens.* This species reaches its largest size at this place, often attaining a height of 25 or more feet. The articulations are unusually thick here, sometimes being as much as 10-12 inches in diameter; Wreck Bay, common on the rocky coast and on the sides and tops of exposed lava hills (no. 2091). INDEFATIGABLE ISL.: Academy Bay, no specimens of this species were secured, but a photograph taken here shows a specimen very similar to this species in general appearance. Its presence, however, is doubtful. Endemic.

Weber, l. c., described two species of *Cereus* from Charles Isl., viz., *C. galapagensis* and *C. Thouarsii,* but gave no characters by which they could be recognized. As there is evidently but one species of *Cereus* on this island, it seems necessary to reduce them to one, *C. galapagensis,* which can be recognized by the following characters. Arborescent, often 8 or more meters in height; trunk cylindrical, 15-30 cm. in diameter; stems diverging; articulations short, robust, obtusely rounded at the extremities, with deep indentations at the points of union of the articulations, 18-angled, costae prominent. Flowers chocolate brown with yellow stripes. Outer petals broadly spatulate cochleariform, 2.3 cm. long, 2 cm. broad at tip, mucronate, margins entire to denticulate; inner petals cuneate mucronate, 2.4 cm. long, 8 mm. broad, margins dentate. Stigmas 11, fruit oval rounded, resembling a large prune, as described by Weber, l. c. A flower from a specimen of this species from Chatham Isl. shows considerable divergence from the above description in that the outer petals are narrowly spatulate, 3.1 cm. long, 8 mm. broad, abruptly acuminate, somewhat cochleariform; inner petals narrowly lanceolate, 3.2 cm. long, 5 mm. broad, acuminate, margins irregularly dentate. Excellent photographs of this species were published by Agassiz (1), Pl. XVI and XX, where specimens from both Charles and Chatham Ids. are shown.

C. nesioticus K. Sch. in Rob. (1), 179.—ABINGDON ISL.: fairly abundant on old cinder beds along the south side of the island. No other vegetation occurs near where the specimens were taken, (no. 2092). ALBEMARLE ISL.: Black Bight, *Snodgrass and Heller;* Christopher Point, *Snodgrass and Heller;* Elizabeth Bay, *Snodgrass and Heller.* CHATHAM ISL.: Sappho Cove, reported by *E. S. King,* one of the members of the expedition. JAMES ISL.: James Bay, common on recent lava south of the bay and along the south side of the island. NARBOROUGH ISL.: northeast side, common on recent lava (no. 2093); south side, occurs to above 500 ft. acc. to *J. S. Hunter.* TOWER ISL.: a few isolated bunches of this species were found on a small deposit of cinders around a blow-hole in the interior of the island (no. 2094).

This species is always found in the most sterile and desert situations and never occurs where there is much if any other vegetation. On both Narborough and James Islands it was found growing abundantly on beds of lava apparently as fresh and uneroded as when first cooled, and it is usually in such situations that it is the most abundant. The branches of this species radiate upward and outward to a height of 2-3 ft., forming candelabra-like masses. The cactus with the habit of *C. peruvianus,* mentioned by Henslow, Mag. Zool. and Bot. 476 (1837), probably belongs to this species. Plate V. Endemic.

C. sclerocarpus K. Sch. in Rob. (1), 179.—ALBEMARLE ISL.: Banks Bay, an arborescent species of *Cereus* was reported from this place by *F. X. Williams;* it most likely belongs to this species; Black Bight, *Snodgrass and Heller;* Christopher Point, *Snodgrass and Heller.* It was noticed, in sailing by this portion of the island, that this species grows very abundantly on the barren lava fields near the coast; Tagus Cove, occasional on cinder beds in the vicinity of the cove and at various places on the side of the mountain. It also occurs fairly abundantly on the floor of the crater at about 3600 ft., where the conditions are desert in the extreme; Villamil, in barren rocky places in the vicinity of the shore, and in similar situations around the base of the mountain to 100 ft. A few specimens were noticed on the inside of the crater at 2750 ft., along with other xerophytic plants, (no. 2095). INDEFATIGABLE ISL.: Academy Bay, abundant in dry rocky places near the coast, seldom occurring any distance inland, (no. 2096). JAMES ISL.: James Bay, abundant on recent lava flows to 900 ft. south of the bay. It occurs most abundantly along the edges of the flows, but stops abruptly as soon as other large vegetation begins to appear, (no. 2097). NARBOROUGH ISL.: south side, a species of *Cereus* was reported by *J. S. Hunter* from this side of the island. It was probably this species.

This species can be distinguished from *C. galapagensis* by the following characters: branches few and usually parallel; articulations usually elongated, somewhat slender, 15-angled. All of the flowers secured were smaller than those described by Schumann, op. c. 180. The great variability in the flowers of this species is well illustrated by two flowers taken from the same plant on Indefatigable Isl. One of these has most of the petals broadly spatulate, truncate, and slightly emarginate, while the other has them mostly narrowly oblong and rounded.

All of the species of *Cereus* which grow on these islands are found only in the most open and desert situations. One may often go for a mile or more inland without seeing a single specimen, but when an exposed lava ridge or a barren field of lava is encountered, where conditions are such that very little other vegetation will grow, specimens will occur abundantly. The probable reason for this is that the species of *Cereus* are shaded out as soon as any considerable amount of other vegetation appears. Plate VI. Endemic.

C. sp.—BINDLOE ISL.: *Heller.* Probably *C. sclerocarpus* acc. to Rob. (1), 180. No specimens of *Cereus* were seen by any of the members of our party when this island was visited.

Opuntia Raf.

O. galapageia Hensl. Mag. Zoöl. and Bot. I. 467, t. 14, f. 2 (1837); Rob. (1), 180.—ABINGDON ISL.: common on lava beds to 1000 ft., occasional above this elevation to 1300 ft. The specimens from the lower parts form trees 8-10 ft. high and have the branches closely arranged, giving the crown a very dense appearance, while those from the upper parts have the branches rather loosely arranged. In general the specimens from the upper parts are much infested with lichens, and have a more sickly appearance than do the specimens on the lower parts, (no. 3001). CHAMPION ISL.: specimens low, with very thick trunks, and apparently very much more abundant than on the adjacent shores of Charles Island, (no. 2098). CHARLES ISL.: abundant below 500 ft., occasional to 1300 ft. on the west side of the main mountain. One of the specimens from this place is peculiar in that the fascicles are made up mostly of capillary bristles but in addition have one or two long pungent spines. There are fewer *Opuntias* here than on most of the other larger islands, a fact that is probably due to the presence of cattle, hogs, and burros which eat the smaller and less protected specimens. DUNCAN ISL.: occasional at 450 ft., abundant around 1000 ft., especially on the floor of the main crater, occasional to 1250 ft. The specimens on this island have the branches openly arranged and often covered with various species of lichens. See Plate X. GARDNER ISL. (near HOOD ISL.): an interesting variation of this species occurs here in that some of the specimens are stemless and have the branches procumbent. One individual of this kind was found growing immediately underneath a specimen with a stem 6-7 ft. high, the relative positions of the two being such that one would judge that the taller was the parent of the procumbent specimen. A short distance away from these there was another individual, with a stem approximately 2 ft. high and 1 ft. in diameter. The general arrangement of the branches, and the arming of the articulations in all three of these specimens, was the same, so that there seems to be but little doubt of their all belonging to the same species, (no. 3002). None of these low forms were noticed on the adjacent Hood Island, a fact that may be due to the presence of goats on the latter. It might be well to mention in this connection that stemless *Opuntias* also occur on Bindloe, Culpepper, Gardner (near Charles), Tower, and Wenman Islands, and with the exception of the Seymour Islands these are the only islands of importance in the group from which land-tortoises or their remains have not been reported. When this is considered together with the fact that the branches of *Opuntias* form the principal article of food of these animals on the lower parts of all of the islands where they occur, a suggestion is given as to the possible origin of the arborescent forms, or at least why the low forms have persisted on the islands where they have been undisturbed. Hood Isl.: generally distributed all over the island except on the southeast side, where they appear to be almost entirely absent for a mile or more back from the shore, (no. 3003). James Isl.: northeast side, abundant on lava beds to above 700 ft. Above 450 ft. the spines are more capillary than they are on specimens seen lower down.

This species has a relatively short trunk, which is usually 1-1½ ft. in diameter, but sometimes as much as 4½ ft. Branches are usually sent off 6-7 ft. above the ground, and as they all come off from about the same level, the crown is regularly rounded, broadly spreading, and somewhat umbrella-shaped. The outer articulations are disk-like and covered with fascicles of capillary bristles, while the proximal ones are thickened, unarmed, and covered with the same kind of brownish periderm that covers the trunk. The flowers are yellow, 7.5 cm. in diameter, contrary to Henslows' description, l. c. The fruit is green, and not red as mentioned by Andersson, see Hemsley, (3), 31. A *Cereus* was no doubt mistaken for an *Opuntia* in this instance, as *Cereus* is the only genus of this family found on the islands, which has red fruit and forms candelabra-like objects.

The young of this species first appears as a flattened disk-shaped mass, dark green in color, and heavily covered with long rigid spines. This first articulation is followed by another above, which has its short axis at right angles to the corresponding axis of the articulation below, a process which is repeated until the plant has attained a height of 5-6 ft., when lateral branches, from which the crown of the tree is developed, are put out. In the meantime the articulations forming the trunk have been increasing in diameter, and as growth takes place more rapidly on the faces than on the edges of the articulations, the trunk soon assumes a more or less rounded form. The development is shown in Plates VII to IX. The trunk is heavily armed with long, ridged, and somewhat deflected spines, when the plant is in the young condition; but by the time the trunk has attained a diameter of a foot or more, most of these have been shed in the following manner. In the young segments the fascicles occupy deep pits in the surface. These pits extend into the cortical parenchyma from which the spines receive their nutrition. By the formation of periderm, inside of this, the nutrition is soon stopped and the spines drop off, remaining attached, however, for a considerable time after their physiological connection with the stem has ceased. The pits which contained the fascicles remain visible as slight indentations through the greater part of the life of the plant. The bark is reddish-brown in color, and is made up of alternating layers of cork and stone cells which slough off in large sheets, one-half inch or more in thickness. After the disintegration of the layers of cork cells, the stone cells remain as loosely arranged plates somewhat resembling the ordinary shellac of commerce in general appearance. Much of the calcium oxalate is got rid of through the bark, as cross sections show a large number of rosette-like crystals of this salt. Plates VII, fig. 2; VIII; IX, fig. 2; X; XI; and XII. Endemic.

O. Helleri K. Sch. in Rob. (1), 180.—BINDLOE ISL.: (?), a species of low *Opuntia* occurs on this island, which is very similar in general appearance to the one on Tower and Wenman Ids. It is very likely the same. CULPEPPER ISL.: owing to the fact that the low *Opuntias* which occur on this island are on the inaccessible parts, no specimens were taken, but seen from a distance they had the general appearance of this species. Tower Isl.: common in various places, forming dense thickets 3-4 ft. high. The specimens on this island are more erect than they are on Wenman, (no. 3005). Wenman Isl.: common in thickets on tops of the cliffs, and hanging down the sides of the same, (no. 3006). Plates XIII, fig. 1; XIV. Endemic.

O. insularis, nov. sp.

Fruticosa circa 1 m. alta; caule spinoso; spinis pungentibus non caducis; ramis brevibus; articulis ovatis apice rotundatis griseo-viridibus, circa 3 dm. longis, 2 dm. latis; areolis orbicularibus tuberculosis lanuginosis denique solum tomentellis; fasciculo 40-50 spinoso; spinis pungentibus flavescentibus inequalibus maximis 3 cm. longis; floribus fructuque ignotis.

A species easily distinguished from the others on the islands by its smaller size, and the shorter and more numerous spines. Albemarle Isl.: Tagus Cove, common on the sides of the tufa hills surrounding the cove. A low *Opuntia* with numerous short stiff spines was reported from the Banks Bay region of this island by Mr. *F. X. Williams.* From his description it seems likely that it is this species, (no. 3014). Plates IX, fig. 1; XV. Endemic.

O. myriacantha Weber in Bois, Dict. d'Hort. 894 (1898); Rob. (1), 181.—Albemarle Isl.: Cowley Bay, occasional on the lower parts, and up to within a few hundred feet of the top, acc. to *R. H. Beck;* Iguana Cove, rare in the immediate vicinity of the cove but abundant a short distance on either side of it; Tagus Cove, fairly abundant on the rim of the crater at 4000 ft. and at various places on the sides of the mountain; the specimens which occur here are smaller than is usually the case; Turtle Cove, common near the shore, specimens of large size; Villamil, very abundant on beds of basaltic lava on the lower parts, often forming forests 25-30 ft. in height; most abundant below 100 ft., but found to some extent as high up as 550 ft., where the specimens are smaller in size than lower down; occasional on the floor of the crater at 2750 ft., (no. 3008). Barrington Isl.: abundant everywhere, forming trees 12 or more feet in height. The photograph of the so-called *O. galapageia,* published by Hemsley, (5), fig. 75, is evidently of this species, as it does not show the broadly spreading crown so characteristic of *O. galapageia.* The photograph shows the trunk to be heavily covered with spines, which is rather unusual for a specimen of the size visible in the photograph. Charles Isl.: *Du Petit Thouars (Dr. Néboux).* The presence of this species on Charles Isl. is doubtful in the extreme. Chatham Isl.: Basso Point, occasional to above 900 ft.; Sappho Cove, common all over the lower parts; Wreck Bay, occasional to 400 ft. Indefatigable Isl.: Academy Bay, abundant below 200 ft., in many instances forming trees 30 or more feet in height. It extends up to 350 ft., but the specimens here are very scattered and small in size, 4-6 ft. being about the average height. At this place the species attains its largest size where the conditions near sea level are less xerophytic than is usually the case, Dr. Baur's statement, that *Opuntias* reach their largest size where conditions are most sterile, being incorrect so far as this species at least is concerned. The probable reason why this and other species do not attain their maximum size at higher altitudes is the greater amount of other vegetation, which tends to shade them too much, (no. 3009); southeast side, abundant on the lower parts, occasional and small at 600 ft. This species occurs most abundantly here in the region between 300 and 450 ft., where it forms a portion of a well-marked belt of *Opuntias* which extends along the south, southeast, and east sides of the island to within a short distance of that portion of the shore opposite Gordon Rocks, (no. 3011). James Isl.: north side, common all over the lower parts; south side, occasional all over the lower parts to 900 ft. Many of the specimens here have very long slender trunks and but few branches, (no. 3012). Jervis Isl.: abundant on the lower parts, where it is 3-7 ft. in height. It also occurs around the top of the island at 1050 ft., but the specimens here are all low, and it is likely that Dr. Baur, (2), 247, refers to these upper specimens when he says that the *Opuntias* from this island are very low, (no. 3013).

This species can be recognized by the following characters: stem long, relatively slender, and irregularly branched near the top, which forms an irregularly shaped crown owing to the fact that the branches arise at different elevations and that many of them are inclined to be pendant. Articulations mostly large, the outer ones oblong to oval and covered with fascicles of slender pungent spines. Corolla large, yellow, 6 cm. broad, and set in a deep cup-like depression in the ovary. Ovary pyramidal, rounded, and covered with fascicles of short stiff spines set in a bunch of short velvety bristles. Style thickened, terminating in 9-11 stigmas variable in number on the same plant. Stamens numerous. Segments of the young plant elliptical oblong, yellowish green in color, and covered with fascicles of slender and rather flexible spines. This species can be readily distinguished from *O. galapageia* by the long slender trunk, irregularly shaped crown, pendant branches, and pungent spines. Plates VII, fig. 1; XIII, fig. 2; and XVI to XVIII. Endemic.

O. sp.—ALBEMARLE ISL.: Cape Rose, common on lava cinders near the coast. INDEFATIGABLE ISL.: north side, abundant; northeast side, occasional in loose ashy soil near the coast, abundant one or more miles inland. SEYMOUR ISL., SOUTH: abundant, forming low tree-like bushes 5-6 ft. high, (no. 3015).

This appears to be entirely distinct from any of the other species of *Opuntia* found on the islands, but as there is so much variation among the species of this genus here, it may prove to be an interesting variation of *O. myriacantha,* to which it is evidently most closely related. As no flowers were secured, its specific identity must remain in doubt. The stem is short, 1 to 1.5 m. high, and covered with fascicles of long stiff spines which remain attached to the plant throughout its life. The branches are short, segments yellowish green in color, and covered with fascicles of long and very stiff spines, some of which reach 7.5 cm. There are usually one or two of these long spines and 10 to 25 shorter ones in each fascicle. The branches sometimes show a tendency to droop, a character which is also common to *O. myriacantha.* As the present species is only found on Albemarle and Indefatigable Islands, where *O. myriacantha* also occurs, and on Seymour Island, which was evidently connected with Indefatigable at some not remote period, one is led to suspect that it may possibly be only a more xerophytic form of *O. myriacantha.* Plate XIX. Endemic.

O. sp.—NARBOROUGH ISL.: a species of an *Opuntia* was reported from the south side of this island by *J. S. Hunter.* It is probably one of the above.

LYTHRACEAE

Cuphea P. Br.

C. patula St. Hil. Fl. Bras. Merid. III. 101 (1832-1833); Rob. (1), 182.—CHATHAM ISL.: Wreck Bay, fairly common in grassy areas around 1700 ft. Further distr. Brazil.

Punica L.

P. Granatum L. Sp. Pl. 472 (1853).—CHATHAM ISL.: Wreck Bay, common bushes and small trees around 700 ft. Widely distributed in tropical and subtropical regions through cultivation.

P. sp.?—CHARLES ISL.: specimen too poor for accurate determination.

RHIZOPHORACEAE

Rhizophora L.

R. Mangle L. Sp. Pl. 443 (1753); Rob. (1), 182.—ALBEMARLE ISL.: Banks Bay, small mangroves occur along the shore at this place acc. to *F. X. Williams;* Cape Rose, small swamps in this vicinity; Cowley Bay, a small mangrove swamp occurs about one-half mile south of this place; Elizabeth Bay, extensive swamps occur in this vicinity and in several other places along the north side of the island; Tagus Cove, no mangroves occur at this place, but there are swamps a short distance north of it; Turtle Cove, specimens are not numerous at this place, but they are often of large size, sometimes attaining a height of 40 or more feet; Villamil, low swamps fringing the shores of the bay and in one or two places on the open coast, (no. 3016). CHARLES ISL.: small patches of low trees occur on the north side (no. 3017). CHATHAM ISL.: Sappho Cove, low trees surrounding the cove in places (nos. 3018-3019). DUNCAN ISL.: a small patch of rather stunted specimens occur in a cove on the northeast side of the island (no. 3020). HOOD ISL.: a few specimens occur on the north shore (no. 3021). INDEFATIGABLE ISL.: in occasional swamps around the shores of bays, lagoons, and on the open coast on all sides of the island except the east. The most extensive mangrove swamps occur on the north shore of this island, which may be due to the fact that this part of the island is entirely shut off from the action of the southeast swell. In regard to the distribution of mangroves Schimper, Pflanzengeographie, 437, says: "Within the tropics its distribution nearly agrees with that of the rain forests. The mangrove is absent or poorly developed on coasts the inland vegetation of which possesses a xerophilous character, except where, as at the mouth of the Indus and other large rivers, there is a considerable freshening of the sea water." The vegetation of the interior, along the north shore of this island, is xerophilous in the extreme, and with the exception of a few showers in the spring and early summer no rain ever falls. James Isl.: common in swamps on the south shore, occasional on the north shore. Narborough Isl.: forming large swamps of low trees around the quiet shores of a shallow bay on the northeast side, common at Mangrove Pt. Tower Isl.: a small patch on the shore of the crater lake near the center of the island. No mangroves occur on the shores of this island, (no. 3023).

Epiphytic plants, other than marine algae, do not attach themselves to the mangrove trees, although it is often the case that non-halophytic plants, only a short distance away, are heavily covered with lichens. *Seedling plants are seldom seen underneath mangrove trees the roots of which are exposed to the action of sea water between tides, the reason for this being that the embryo plants are carried away before they have time to take root.* Further distr. general on tropical shores.

MYRTACEAE

Eugenia L.

E. Jambos L. Sp. Pl. 470 (1753).—Chatham Isl.: Wreck Bay, trees in gardens, introduced, (no. 3034). Widely distributed in tropical regions.

Psidium L.

P. galapageium Hook. f. (3), 224; Rob. (1), 182.—Abingdon Isl.: occasional small trees, 500-1000 ft., on the southwest side of the island. On the south and southeast sides the species apparently does not occur below 1000 ft., (no. 3030). Albemarle Isl.: Banks Bay, at 2300 ft., according to *F. X. Williams;* Cowley Bay, low bushes at 1250 ft. At 2000 ft.

they increase somewhat in size, but do not form trees as is usually the case at this elevation; Iguana Cove, *Snodgrass and Heller;* Villamil, bushes at 100 ft., low forest trees common at 350-600 ft., (no. 3025). Chatham Isl.: Wreck Bay, common bushes and low trees, 150-400 ft., (nos. 3026-3027). Indefatigable Isl.: Academy Bay, bushes at 300 ft., gradually increasing in size to 600 ft., where the species occurs abundantly as forest trees often 2 ft. or more in diameter, (no. 3028). James Isl.: James Bay, occasional small trees, 350-2800 ft., (no. 3029). There are usually no epiphytic plants found on this species, probably owing to the fact that the bark is so smooth that spores and small seeds would have difficulty in finding a lodgement. The wood is dark brown in color and is very close grained. It is used by the natives of Albemarle Island in making the hubs and felloes for their carts, a use for which it seems well adapted. Endemic.

COMBRETACEAE

Conocarpus Gaertn.

C. erectus L. Sp. Pl. 176 (1753); Rob. (1), 182.—Albemarle Isl.: Iguana Cove, *Snodgrass and Heller;* Turtle Cove, bushes in low dense thickets just back of the beach; Villamil, common in thickets near the shore, trees 25 ft. and more in height around brackish pools some distance back from the shore, (no. 3031). Chatham Isl.: Sappho Cove, bushes on sand beaches (no. 3032). Indefatigable Isl.: Academy Bay, occasional low bushes on the beach (no. 3033). James Isl.: James Bay, low bushes forming thickets on sand beaches (no. 3034). Widely distributed in tropical regions.

Laguncularia Gaertn.

L. racemosa (L.) Gaertn. Fruct. III. 209, t. 217, f. 2 (1805). *Conocarpus racemosus* L. Syst. ed. 10, 930 (1760). *L. racemosa* Gaertn. l. c.; Rob. (1), 183.—Abingdon Isl.: forming dense low thickets on sand beaches (no. 3035). Albemarle Isl.: Cowley Bay, forming a grove of small trees on a gravel beach; Christopher Point, *Snodgrass and Heller;* Elizabeth Bay, *Snodgrass and Heller;* Turtle Cove, low dense thickets on the beach; Villamil, abundant, forming low dense forests of bushes and small trees on sand beaches around the bay. CHARLES ISL.: low dense thickets on the beach (no. 3036). CHATHAM ISL.: Sappho Cove, bushes and small trees on sand beaches (no. 3037). DUNCAN ISL.: a few stunted bushes on the shore of a cove on the northeast side (no. 3038). INDEFATIGABLE ISL.: Academy Bay, common bushes and small trees around the shores of the bay (no. 3039); southeast side, low spreading trees, with rounded tops, near the shore; also noticed in various other places on the north and northwest sides of the island, (nos. 3040-3041). JAMES ISL.: James Bay, common on sand beaches (no. 3043). It also occurs in various other places on the north and south shores. JERVIS ISL.: bushes and small trees around a salt lagoon (no. 3042). NARBOROUGH ISL.: northeast side, common bushes around bays and lagoons; east side, *Snodgrass and Heller.* SEYMOUR ISL., SOUTH: groves of mangroves, either of this species or *Rhizophora Mangle,* possibly both, were noticed on the south shore of this island while we were cruising along the north shore of Indefatigable Island on one of our numerous turtle-fishing expeditions.

MELASTOMACEAE

Miconia R. & P.

M. Robinsoniana Cogniaux in Rob. (1), 183.—CHATHAM ISL.: Wreck Bay, in ditches, 1000-1700 ft. In various places in this region there are deep ditches with perpendicular walls, apparently dug. These bushes, along with several species of ferns, are usually found in such ditches, (no. 3044). Endemic.

ONAGRACEAE

Jussiaea L.

J. repens L. Sp. Pl. 388 (1753).—CHATHAM ISL.: Wreck Bay, in pools and in small streams, 1000-1700 ft., (no. 3045). Widely distributed in tropical countries.

HALORRHAGIDACEAE

Myriophyllum L.

M. sp. Wolf. (1), 284; Rob. (1), 183.—CHARLES ISL.: in a brook near the hacienda, according to Wolf, l. c. At the times we visited this island there were no brooks except in the immediate vicinity of two small springs.

UMBELLIFERAE

Apium L.

A. laciniatum (DC.) Urb. in Mart. Fl. Bras. XI. 1, 343 (1879). *Helosciadium laciniatum* DC. Mém. Soc. Phys. Genèv. IV. 495 (1828). *A. laciniatum* Urb. l. c.; Rob. (1), 184.—CHARLES ISL.: on the rim of a crater at 1550 ft. (no. 3046). Further distr. W. S. Am.

A. leptophyllum (DC.) F. Muell, acc. to Benth. Fl. Aust. III. 372 (1866). *Helosciadium leptophyllum* DC. Mém. Soc. Phys. Genèv. IV. 493 (1828). *A. leptophyllum* F. Muell. l. c.; Rob. (1), 184.—ABINGDON ISL.: common among rocks in open grassy country around 1100 ft. (no. 3049). ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, abundant in shady places at 4000 ft. (no. 3048); Villamil, common, 700-3150 ft., (no. 3047). CHATHAM ISL.: Wreck Bay, in open grassy country around 900 ft. (no. 3050). JAMES ISL.: *Darwin.* Widely distributed.

Centella L.

C. asiatica (L.) Urb. in Mart. Fl. Bras. XI. 1, 287 (1879). *Hydrocotyle asiatica* L. Sp. Pl. 234 (1753). *C. asiatica* Urb. l. c.; Rob. (1), 184.—ALBEMARLE ISL.: Villamil, common in moist protected places among rocks at 1500 ft. (no. 3050). CHATHAM ISL.: Wreck Bay, abundant in grassy country above 1200 ft. (no. 3052). DUNCAN ISL.: in protected places around 1250 ft. (no. 3053). Widely distributed.

Hydrocotyle L.

H. galapagensis Rob. (1), 184.—CHATHAM ISL.: upper regions, *Baur.* Endemic.

Petroselinum Koch

P. sativum Hoffm. Gen. Umb. 177 (1814); Rob. (1), 184. —CHARLES ISL.: *Andersson.* Introduced from the Old World, according to Rob. l. c.

PLUMBAGINACEAE

Plumbago L.

P. scandens L. Sp. Pl. ed. 2, 215 (1762); Rob. (1), 185.—ABINGDON ISL.: common in woodland at 1300 ft. (no. 3054). ALBEMARLE ISL.: Cowley Bay, common around 1900 ft. (no. 3059); Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, common near the shore (no. 3058); Tagus Cove, common in shady places to 2000 ft. (no. 3055); Villamil, common near sea level and in various places throughout the moist region (no. 3057). CHARLES ISL.: occurs to some extent near sea level, but is most abundant in shady places at 1000-1400 ft., (nos. 3061-3063). CHATHAM ISL.: *Andersson; Snodgrass and Heller.* DUNCAN ISL.: a few specimens were taken at 1300 ft. (no. 3064). GARDNER ISL. (near HOOD ISL.): (no. 3066). HOOD ISL.: occasional to 400 ft. (no 3067). INDEFATIGABLE ISL.: Academy Bay, occasional to 400 ft. (no. 3070); northwest side, occasional to 400 ft.; southeast side, rare at 600 ft. (nos. 3069-3071). JAMES ISL.: James Bay, fairly common in the moist region (no. 3065). Further distr. general in tropical countries.

APOCYNACEAE

Vallesia R. & P.

V. glabra (Cav.) Link, Enum. Hort. Berol. I. 207 (1821). *Rauwolfia glabra* Cav. Ic. III. 50, t. 297 (1795). *V. cymbaefolia* Ort. Hort. Matr. Dec. 58 (1798); Rob. (1), 185.—ALBEMARLE ISL.: Christopher Point, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller.* CHARLES ISL.: bushes on the beach (no. 3073). CHATHAM ISL.: Sappho Cove, bushes on the beach (no. 3072); Wreck Bay, bushes 4-6 ft. high on the beach (no. 3071). HOOD ISL.: bushes on sand beaches (no. 3074). INDEFATIGABLE ISL.: southeast side, common bushes on the shore and to some extent in the interior in the dryer parts of the lower regions (no. 3075). JAMES ISL.: northeast side, common bushes near the shore (no. 3091). Further distr. S. U. S., Mex., W. Ind., S. Am.

V. pubescens Anderss. (1), 195, (2), 79; Rob. (1), 185.—ALBEMARLE ISL.: Cowley Bay, occasional bushes near the beach (no. 3076). CHARLES ISL.: common on the beach and to some extent in the interior to 600 ft. (no. 3081). HOOD ISL.: bushes at 600 ft. (no. 3077). INDEFATIGABLE ISL.: Academy Bay, low bushes near the shore (no. 3078); north and northeast sides, on the beach. Endemic.

ASCLEPIADACEAE

Asclepias L.

A. angustissima Anderss. (1), 196, (2), 79; Rob. (1), 185. *Vincetoxicum* ?, Rob. (1), 186.—ABINGDON ISL.: above 450 ft. (no. 3082). ALBEMARLE ISL.: Banks Bay, according to *F. X. Williams;* Christopher Point, *Snodgrass and Heller;* Cowley Bay, at 800 ft.; Tagus Cove, occasional on lava beds at 300 ft. (no. 3083); Villamil, abundant on bushes and rocks near sea level (no. 3084). CHARLES ISL.: occasional on lava fields. DUNCAN ISL.: vines covering rocks at 1275 ft. INDEFATIGABLE ISL.: southeast side, vines on rocks at 600 ft. (no. 3086). JAMES ISL.: James Bay, common to 900 ft., one of the first phanerogamic plants to invade the recent lava at this place, (no. 3087). JERVIS ISL.: occasional vines, 650-1050 ft., (no. 3088). NARBOROUGH ISL.: (no. 3089). Further distr. S. U. S., Mex., W. Ind., S. Am.

A. curassavica L. Sp. Pl. 215 (1753).—CHATHAM ISL.: Wreck Bay, abundant in the grassy region around 900 ft. (no. 3090). Further distr. S. U. S., Mex., W. Ind., S. Am.

CONVOLVULACEAE

Argyreia Lour.

A. tiliaefolia (Desr.) Wight, Ic. Pl. Ind. IV. 1, 12, t. 1358 (1850). *Convolvulus tiliaefolius* Desr. Lam. Ency. III. 544, no. 20 (1789). *Ipomoea campanulata* Rob. (1), 187, not L.—ALBEMARLE ISL.: Iguana Cove, common on trees and bushes; Turtle Cove, abundant in woodland near the shore (no. 3136); Villamil, on trees and completely covering large masses of lava in the vicinity of the shore, abundant, covering bushes in great profusion in open places in the vegetation, at 600-1000 ft., and occasional among rocks at 3150 ft., where the specimens have smaller leaves than on the lower levels, (nos. 3137-3140).

INDEFATIGABLE ISL.: Academy Bay, occasional, 400-500 ft., forming a thick and almost impenetrable mass of vines on trees and bushes, 500-650 ft., (nos. 3141-3142).

Calystegia R. Br.

C. Soldanella R. Br. Prodr. 483 (1810); Rob. (1), 186.—CHARLES ISL.: *Edmonston.* Widely distributed.

Cuscuta L.

C. acuta Engelm. Trans. Acad. Sci. St. Louis I. 497 (1859); Rob. (1), 186.—ALBEMARLE ISL.: Tagus Cove, common on *Rhynchosia minima* in open flat areas near the shore (no. 3092). BINDLOE ISL.: *Snodgrass and Heller.* CHARLES ISL.: on *Boerhaavia viscosa* on the lower parts (no. 3094). CHATHAM ISL.: Sappho Cove, occasional on small *Scalesia* bushes at 800 ft. (no. 3093). NARBOROUGH ISL.: south side, *Snodgrass and Heller.* Endemic.

C. gymnocarpa Engelm. l. c. 496 (1859); Rob. (1), 186.—ALBEMARLE ISL.: Cowley Bay, *Baur.* JAMES ISL.: James Bay, fairly common (no. 3095). Endemic.

Evolvulus L.

E. hirsutus HBK. Nov. Gen. & Sp. III. 117 (1818). *E. glaber* Spreng. Syst. I. 862 (1825); Rob. (1), 186.—ABINGDON ISL.: occasional among rocks near the shore (no. 3096). ALBEMARLE ISL.: Cowley Bay, *Andersson;* Iguana Cove, *Snodgrass and Heller.* CHARLES ISL.: abundant in open places in the vegetation above 450 ft. (no. 3097). CHATHAM ISL.: Basso Point, occasional in open woodland above 450 ft. (no. 3099); Wreck Bay, abundant among rocks on the lower parts (no. 3098). DUNCAN ISL.: common on the lower parts (no. 3100). INDEFATIGABLE ISL.: Academy Bay, common in open woodland at 350 ft. (no. 3101); northwest side, occasional at 200 ft. (no. 3102). JAMES ISL.: *Scouler.* SEYMOUR ISL., NORTH: *Snodgrass and Heller.* Further distr. W. Ind., S. Am.

E. simplex Anderss. (1), 211, (2), 87; Rob. (1), 187.—ALBEMARLE ISL.: Tagus Cove, occasional in the flat area near the shore and on the tufa hills surrounding the cove (nos.

3105-3107). Charles Isl.: common in rocky soil near the shore (no. 3104). Chatham Isl.: *Andersson; Baur.* Indefatigable Isl.: northwest side, common in tufaceous soil; north side, *Snodgrass and Heller.* James Isl.: James Bay, *Snodgrass and Heller.* Endemic.

Ipomoea L.

I. Bona-nox L. Sp. Pl. ed. 2, 228 (1762); Rob. (1), 187.—Albemarle Isl.: Cowley Bay, a species, similar to this one, was reported from the upper regions by *R. H. Beck;* Iguana Cove, covering bushes and small trees with a thick tangled mass of vines (nos. 3108-3109); Villamil, common on bushes in the open country, 600-1000 ft., (no. 3110). James Isl.: James Bay, rare at 2100 ft. (no. 3111). Widely distributed.

I. Habeliana Oliv. in Hook. Ic. t. 1099 (1871); Rob. (1), 188.—Abingdon Isl.: common on lava fields near the shore (no. 3112). Bindloe Isl.: occasional near the shore, abundant around 300 ft., where it ascends into trees of *Bursera graveolens,* forming quite a conspicuous liane. Charles Isl.: occasional among rocks near the shore (no. 3113-3114). Duncan Isl.: fairly abundant in rocky places at 1200 ft. (no. 3115). Gardner Isl. (near Hood Isl.): common on rocks at the south end of the island (no. 3116). Hood Isl.: common at 600 ft. (no. 3117). James Isl.: James Bay, common on rocks around 900 ft. Tower Isl.: (no. 3118).

I. Kinbergi Anderss. (1), 212, (2), 88; Rob. (1), 188.—Abingdon Isl.: common on lava beds near the shore, occasional at 800 ft., (no. 3119). Brattle Isl.: (no. 3120). Chatham Isl.: north side, *Andersson.* Indefatigable Isl.: northwest side, *Andersson; Baur.* Jervis Isl.: occasional on the sides and at the top of the island at 1050 ft. (no. 3121). Tower Isl.: *Snodgrass and Heller.* Wenman Isl.: common on *Opuntia Helleri* (no. 3122). Endemic.

I. linearifolia Hook. f. (3), 204; Rob. (1), 188.—James Isl.: *Darwin.* Further distr. Cape Verde Ids. according to Index Kewensis.

I. Nil Roth, Catalect. I. 36 (1797); Rob. (1), 188.—Charles Isl.: *Snodgrass and Heller.* Chatham Isl.:

Wreck Bay, *Baur.* Indefatigable Isl.: *Andersson.* Doubtful. Further distr. general in warm regions.

I. pentaphylla (L.) Jacq. Coll. II. 297 (1788). *Convolvulus pentaphyllus* L. Sp. Pl. ed. 2, 223 (1762). *I. pentaphylla* Jacq. l. c.; Rob. (1), 188.—Abingdon Isl.: occasional at 500 ft. (no. 3123). Albemarle Isl.: Tagus Cove, common in tufaceous soil near the shore and on the hills surrounding the cove (no. 3124). Charles Isl.: *Andersson.* Chatham Isl.: north side, *Andersson.* Duncan Isl.: *Snodgrass and Heller.* Gardner Isl. (near Hood Isl.): *Snodgrass and Heller.* Hood Isl.: *Baur.* Indefatigable Isl.: northwest side, occasional in tufaceous soil on the lower parts; north side, *Snodgrass and Heller.* James Isl.: *Andersson.* Jervis Isl.: *Baur.* Seymour Isl., north: *Snodgrass and Heller.* Tower Isl.: *Snodgrass and Heller.* Further distr. general in tropics.

I. Pes-caprae (L.), Sweet, Hort. Suburb. London, 35, (1818). *Convolvulus Pes-caprae* L. Sp. Pl. 159 (1753). *I. biloba* Rob. (1), 187, not Forsk.—Albemarle Isl.: Black Bight, *Snodgrass and Heller;* Iguana Cove, *Snodgrass and Heller;* Villamil, on sand beaches (no. 3126). Indefatigable Isl.: southeast side, common vines, 75-100 ft. long, on the beach and in salt-incrusted sand around the shores of salt lagoons, (no. 3127). Widely distributed on tropical shores.

I. triloba L. Sp. Pl. 161 (1753). *I. galapagensis* Anderss. (1), 213, (2), 88; Rob. (1), 187.—Albemarle Isl.: Iguana Cove, occasional on rocks at 200 ft. (no. 3135); Tagus Cove, common on the lower parts (nos. 3128-3129). Charles Isl.: rare among rocks near the shore (no. 3130). Chatham Isl.: Wreck Bay, abundant on the lower parts, occasional at 700 ft., (nos. 3131-3133). Duncan Isl.: *Snodgrass and Heller.* Hood Isl.: *Snodgrass and Heller.* Indefatigable Isl.: Academy Bay, abundant on bushes and small trees in the open areas, 450-600 ft., and probably higher, (no. 3134). James Isl.: James Bay, *Snodgrass and Heller.* Seymour Isl., south: *Snodgrass and Heller.* Further distr. S. U. S., Mex., W. Ind., S. Am.

I. tubiflora Hook. f. (3), 204; Rob. (1), 189.—James Isl.: *Darwin.* Endemic.

HYDROPHYLLACEAE

Hydrolea L.

H. dichotoma Ruiz & Pavon, Fl. Per. III. 22, t. 244 (1802).—ALBEMARLE ISL.: Tagus Cove, occasional in lava crevices at 4000 ft. (no. 3144). Further distr. Mex., W. S. Am.

BORAGINACEAE

Coldenia L.

C. Darwini (Hook. f.) Gürke in Engl. & Prantl, Nat. Pflanzenf. IV. Ab. 3a, 90 (1893). *Galapagoa Darwini* Hook. f. (3), 196. *C. Darwini* Gürke l. c.; Rob. (1), 189.—ABINGDON ISL.: common on lava beds near the shore (no. 3144). ALBEMARLE ISL.: Tagus Cove, common in tufaceous soil on the lower parts (no. 3146); Villamil, abundant in loose ashy soil in open places near sea level (no. 3145). BINDLOE ISL.: common near the shore (no. 3147). CHARLES ISL.: abundant on sand beaches (no. 3148). CHATHAM ISL.: Basso Point, common on the beach (no. 3149). INDEFATIGABLE ISL.: north side, abundant on sand beaches (no. 3151); northwest side, *Baur;* southeast side, common on sand beaches and to some extent in dry open places in the interior (no. 3150). JAMES ISL.: Orchilla Bay, *Baur.* JERVIS ISL.: a few specimens were seen at 950 ft. (no. 3152). There is much variation in the size of the glomerules, these being large in some specimens and small in others. The arrangement of the glomerules varies from closely crowded to well separated. Some of the specimens are without rigid setae, a character which such specimens share with *C. fusca.* Endemic.

C. fusca (Hook. f.) Gürke l. c. *Galapagoa fusca* Hook. f. (3), 196. *C. fusca* Gürke l. c.; Rob. (1), 189.—ALBEMARLE ISL.: Tagus Cove, *Snodgrass and Heller;* Villamil, *Baur.* BARRINGTON ISL.: covers a small area at 350 ft. (no. 3155). BRATTLE ISL.: (no. 3156). CHARLES ISL.: occasional among rocks in the vicinity of the shore (no. 3154). CHATHAM ISL.: Wreck Bay, *Baur.* HOOD ISL.: abundant on sand beaches (no. 3153). INDEFATIGABLE ISL.: northwest side, *Andersson.* SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* The two species of *Coldenia* found on these islands are so closely related to each other that it is often difficult to decide to which species a specimen belongs. While the extremes present very pronounced specific characters, the intermediate forms often partake of the characters of both species to a greater or less extent. Endemic.

Cordia L.

C. Anderssoni Gürke, op. c. 83; Rob. (1), 189.—Charles Isl.: *Andersson; Lee.* Chatham Isl.: north side, *Andersson.* James Isl.: James Bay, occasional bushes (no. 3157). Endemic.

C. galapagensis Gürke, op. c. 83; Rob. (1), 190.—Abingdon Isl.: common bushes above 450 ft. (no. 3158). Albemarle Isl.: Cowley Bay, common bushes at 2000 ft. (no. 3163); Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, common near the shore (no. 3159); Tagus Cove, common bushes to 4,000 ft. (nos. 3161-3162). Barrington Isl.: bushes 6-8 ft. high at 350 ft. (no. 3164). Chatham Isl.: Basso Point, low spreading bushes on recent lava (no. 3166); Wreck Bay, occasional bushes to 650 ft. (no. 3165). Duncan Isl.: occasional bushes to 650 ft. (no. 3167). Hood Isl.: occasional bushes all over the island (no. 3168). Indefatigable Isl.: northwest side, *Andersson; Baur.* Narborough Isl.: *Snodgrass and Heller.* Endemic.

C. Hookeriana Gürke, l. c.; Rob. (1), 190.—Albemarle Isl.: Cowley Bay, occasional bushes near the shore (no. 3171); Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, slender bushes on the side of a steep cliff above the cove (no. 3173); Tagus Cove, *Snodgrass and Heller;* Villamil, common bushes 6-8 ft. high on lava beds in the vicinity of the shore and up to 350 ft. (no. 3172). Charles Isl.: occasional bushes in tufaceous soil mixed with small pieces of lava at 1000 ft. (no. 3174). James Isl.: James Bay, common bushes fringing recent lava flows on the lower parts (no. 3175); northeast side, occasional bushes 10-12 ft. high (no. 3176). Narborough Isl.: north side, bushes 4-6 ft. high on lava beds; south side, *Snodgrass and Heller.* Endemic.

C. leucophlyctis Hook. f. (3), 199; Rob. (1), 190.—Albemarle Isl.: *Macrae; Darwin.* James Isl.: *Scouler; Baur.* Endemic.

C. lutea Lam. Ill. I, 421 (1791); Rob. (1), 190.—ABINGDON ISL.: common bushes on lava beds to 450 ft., occasional to 700 ft. ALBEMARLE ISL.: Cowley Bay, occasional low bushes in the vicinity of the shore; Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, low trees at 200 ft. (no. 3179); Cape Rose, low bushes on lava cinders (no. 3180); Tagus Cove, bushes and small trees all over the lower parts and up to 1500 ft., especially abundant on the edges of recent lava flows, (no. 3181); Villamil, low trees and bushes near sea level (no. 3182). BARRINGTON ISL.: bushes in the vicinity of the shore, small trees at 350 ft., (no. 3184). BINDLOE ISL.: common bushes on the borders of cinder flows (no. 3185). CHARLES ISL.: *Andersson; A. Agassiz; Baur; Snodgrass and Heller.* CHATHAM ISL.: north side, *Darwin; Andersson;* Wreck Bay, common bushes in rocky soil near the shore (no. 3187). GARDNER ISL. (near HOOD ISL.): occasional low bushes (no. 3188). HOOD ISL.: occasional low bushes and trees to 500 ft. (nos. 3189-3191). INDEFATIGABLE ISL.: southeast side, abundant near the shore and at 600 ft. (no. 3192). JAMES ISL.: James Bay, (no. 3193). JERVIS ISL.: (no. 3194). SEYMOUR ISL.: *Snodgrass and Heller.* TOWER ISL.: occasional low bushes (no. 3265). Further distr. W. S. Am.

C. revoluta Hook. f. (3), 199; Rob. (1), 191.—CHARLES ISL.: *Darwin.* Endemic.

Var. **nigricans** Hook. f. (3), 199; Rob. (1), 191.—ALBEMARLE ISL.: *Macrae.* Endemic.

C. Scouleri Hook. f. (3), 200; Rob. (1), 191.—ALBEMARLE ISL.: Villamil, bushes 10-12 ft. high, 100-550 ft., (no. 3195). CHATHAM ISL.: north side, *Andersson;* Wreck Bay, *Baur.* JAMES ISL.: *Andersson.* Endemic.

C. n. sp.? Rob. (1), 191.—CHARLES ISL.: *Edmonston.*

Heliotropium L.

H. Anderssonii Rob. (1), 192. *H. asperrimum* Anderss. (2), 86, not R. Br.—INDEFATIGABLE ISL.: *Andersson.* Endemic.

H. curassavicum L. Sp. Pl. 130 (1753); Rob. (1), 192.—ABINGDON ISL.: abundant on sand beaches (no. 3196). AL-

BEMARLE ISL.: Villamil, on sand beaches and around brackish pools (no. 3197). BINDLOE ISL.: *Snodgrass and Heller.* BRATTLE ISL.: (no. 3198). CHATHAM ISL.: Basso Point, on sand beaches (no. 3199); Wreck Bay, abundant near the beach (no. 3200). GARDNER ISL. (near HOOD ISL.): on sand beaches (no. 3201). HOOD ISL.: *Snodgrass and Heller.* INDEFATIGABLE ISL.: southeast side, on sand beaches; north side, *Snodgrass and Heller.* JAMES ISL.: northeast side, common on sand beaches and on a rock one-half mile off the shore (no. 3204). SEYMOUR ISL., SOUTH: *Snodgrass and Heller.* Widely distributed.

H. indicum L. Sp. Pl. 130 (1753); Rob. (1), 192.—CHARLES ISL.: in mud near a spring at 1000 ft. (no. 3208). CHATHAM ISL.: Wreck Bay, in shady places, 450-900 ft., (no. 3206). Widely distributed in warm countries.

H. parviflorum L. Mant. 201 (1771); Rob. (1), 192.—ABINGDON ISL.: common on the lower parts, occasional above 1000 ft., (no. 3209). ALBEMARLE ISL.: Cowley Bay, occasional at 1800 ft. (no. 3210); Iguana Cove, common near the shore (no. 3213); Tagus Cove, common to 1600 ft. (nos. 3211-3212). BARRINGTON ISL.: *Snodgrass and Heller.* BRATTLE ISL.: (no. 3214). CHAMPION ISL.: *J. R. Slevin* collector (no. 3215). CHARLES ISL.: abundant in various situations all over the island (no. 3218). CHATHAM ISL.: Wreck Bay, common near the shore and to 350 ft. (nos. 3216-3217). GARDNER ISL. (near HOOD ISL.): (no. 3219). HOOD ISL.: occasional at 200 ft. (nos. 3220-3221). INDEFATIGABLE ISL.: northwest side, *Andersson;* southeast side, common on the lower parts and in the vicinity of the shore (no. 3222). JAMES ISL.: James Bay, abundant on the lower parts (no. 3223). NARBOROUGH ISL.: south side, *Snodgrass and Heller.* TOWER ISL.: *Snodgrass and Heller.* WENMAN ISL.: (no. 3224). Widely distributed in warm countries.

Tournefortia L.

T. hirsutissima L. Sp. Pl. 140 (1753); Rob. (1), 193.—CHATHAM ISL.: *Chierchia.* Robinson, l. c., suggests that this specimen may belong to *Tournefortia rufo-sericea,* a possibility which seems very likely, as subsequent collections have failed to show the species. Further distr. Mex., W. Ind., S. Am.

T. psilostachya HBK. Nov. Gen. & Sp. III. 78 (1818); Rob. (1), 193.—ABINGDON ISL.: common bushes, 1200-1300 ft., (no. 3225). ALBEMARLE ISL.: Iguana Cove, forming dense thickets near the shore; Tagus Cove, common bushes on the side of the mountain (no. 3227); Turtle Cove, common bushes on lava beds near the beach (no. 3228); Villamil, one of the commonest shrubs, 350-1300 ft., (no. 3226). CHARLES ISL.: common bushes in woodland at 1000 ft. (no. 3231). CHATHAM ISL.: Wreck Bay, common bushes in the vicinity of the shore (no. 3234). DUNCAN ISL.: common at 1275 ft. (no. 3230). HOOD ISL.: occasional bushes above 450 ft. (no. 3232). INDEFATIGABLE ISL.: Academy Bay, bushes 6-7 ft. high at 100 ft. (no. 3233). JAMES ISL.: *Douglas; Scouler; Snodgrass and Heller.* This species was probably overlooked by earlier collectors and has not become more abundant recently as suggested by Robinson, l. c. Further distr. tropical S. Am.

T. pubescens Hook. f. (3), 198; Rob. (1), 193.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, common bushes above 100 ft. (nos. 3235-3236). CHARLES ISL.: common bushes in woodland at 1000 ft. CHATHAM ISL.: Basso Point, occasional bushes at 750 ft. (nos. 3237-3240); Wreck Bay, bushes 6-10 ft. high at 450 ft. DUNCAN ISL.: low bushes around 1300 ft. (nos. 3241-3242). INDEFATIGABLE ISL.: Academy Bay, common bushes on the lower parts (no. 3243); northwest side, *Andersson;* southeast side, occasional bushes at 600 ft. (nos. 3244-3246). JAMES ISL.: James Bay, low bushes, abundant at 1000 ft., (no. 3247). Endemic.

T. rufo-sericea Hook. f. (3), 197; Rob. (1), 193.—ABINGDON ISL.: common bushes above 900 ft. (no. 3248). ALBEMARLE ISL.: Iguana Cove, forming dense thickets in the flat area near the shore (no. 3250); Tagus Cove, common bushes at 1600 ft. (no. 3252); Turtle Cove, common bushes in thickets near the beach (no. 3251); Villamil, occurs at various elevations on the lower parts, but most abundant in open areas above 600 ft., also common in the grassy region above 1500 ft., and on the rim of the crater at 3150 ft., (no. 3249). CHARLES ISL.: common bushes in open woodland around 1000 ft. and on the sides of the craters above this elevation to 1700 ft. (nos. 3253-3254). CHATHAM ISL.: Wreck Bay, common bushes above 400 ft. (no. 3255). DUNCAN ISL.: at 1275 ft. INDEFATIGABLE ISL.: Academy Bay, common bushes in a dense growth of vegetation in the open areas around 550 ft. and above (no. 3256). JAMES ISL.: James Bay, occurs to some extent on the lower parts, abundant at 2100 ft., occasional at 2850 ft., (nos. 3257-3258). There is much variation in the amount of pubescence. Endemic.

T. strigosa Anderss. (1), 207, (2), 85, t. 9, f. 3; Rob. (1), 194.—ALBEMARLE ISL.: Turtle Cove, occasional low spreading bushes in the vicinity of the shore (no. 3259); Villamil, *Baur.* CHARLES ISL.: *Andersson.* CHATHAM ISL.: *Andersson.* INDEFATIGABLE ISL.: Academy Bay, occasional bushes in sandy soil near the shore (no. 3262); north side, occasional bushes at 250 ft. (no. 3261); southeast side, bushes at 550 ft. (no. 3260). JAMES ISL.: James Bay, common bushes 4-7 ft. high (no. 3263). Endemic.

T. syringaefolia Vahl, Symb. III. 23 (1794). *T. laurifolia* Vent. Choix. Pl. 2 (1803); Rob. (1), 193.—CHATHAM ISL.: *Chierchia* according to Caruel. JAMES ISL.: *Andersson.* Possibly a less pubescent form of either *T. psilostachya* or *T. pubescens.* Further distr. Mex., tropical S. Am.

VERBENACEAE

Avicennia L.

A. officinalis L. Sp. Pl. 110 (1753); Rob. (1), 194.—ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Turtle Cove, common on pebble beaches, sometimes attaining the size of large trees, (no. 3266); Turtle Point, common, according to *J. S. Hunter;* Villamil, common trees around salt lakes, and to some extent on sand beaches. CHARLES ISL.: common on the beach and around a salt lake (no. 3267). CHATHAM ISL.: Sappho Cove, occasional small trees around salt pools (no. 3268). DUNCAN ISL.: a single small tree of this species was found in a cove on the northeast side of the island (no. 3269). INDEFATIGABLE ISL.: Academy Bay, low trees on the beach and around salt marshes (no. 3270); southeast side, small trees around a brackish lake (no. 3271); north side, abundant in various places along the shore. Occasional isolated trees were seen on the shore at various places between Academy and Conway Bays. JAMES ISL.: James Bay, low spreading trees around a salt lake near the shore (no. 3272). JERVIS ISL.: low trees around a salt lagoon (no. 3273). SEYMOUR ISL., SOUTH: low trees around a salt lake on the west side of the island (no. 3274). Widely distributed on tropical shores.

Clerodendron L.

C. molle HBK. Nov. Gen. & Sp. II. 244 (1817); Rob. (1), 194.—ALBEMARLE ISL.: Iguana Cove, common bushes near the shore (no. 3275); Villamil, occasional bushes on lava beds near sea level and up to 500 ft. (no. 3276). CHARLES ISL.: common bushes, forming thickets, 450-650 ft., (no. 3277). CHATHAM ISL.: Wreck Bay, occasional bushes at 650 ft. (no. 3278). INDEFATIGABLE ISL.: Academy Bay, occasional bushes in woodland on the lower parts (no. 3279); northwest side, bushes to 550 ft. JAMES ISL.: *Scouler; Andersson; Snodgrass and Heller.* Further distr. Ecuador.

C. sp. Hook. f. (4), 261; Rob. (1), 195.—CHARLES ISL.: *Edmonston.*

C. sp. Hook. f., l. c.; Rob. l. c.—CHARLES ISL.: *Edmonston.*

Duranta L.

D. repens L. Sp. Pl. 637 (1753). *D. Plumieri* Jacq. Stirp. Am. 186, t. 176, f. 76 (1763); Rob. (1), 195.—ALBEMARLE ISL.: Tagus Cove, occasional bushes, 2100-3600 ft., (no. 3280); Villamil, low bushes on the rim of the crater at 3150 ft. (no. 3281). DUNCAN ISL.: common bushes 6-8 ft. high at 1275 ft. (no. 3283). Further distr. S. U. S., Mex., W. Ind., S. Am.

Lantana L.

L. peduncularis Anderss. (1), 200, (2), 81; Rob. (1), 195. —ABINGDON ISL.: common bushes on the lava beds on the lower parts, occasional at 1550 ft. ALBEMARLE ISL.: Cowley Bay, common bushes at 2100 ft. (no. 3288); Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, *Snodgrass and Heller;*

Tagus Cove, common in tufaceous soil on the lower parts, occasional at 4000 ft., (no. 3285); Turtle Cove, (no. 3286); Villamil, occasional bushes on lava beds (no. 3287). BARRINGTON ISL.: *Snodgrass and Heller.* BINDLOE ISL.: common bushes to 300 ft. (no. 3289). CHARLES ISL.: (no. 3290). CHAMPION ISL.: *J. R. Slevin* collector (no. 3291). CHATHAM ISL.: Wreck Bay, bushes 3-4 ft. high (no. 3292). DUNCAN ISL.: occasional bushes at 1100 ft. (no. 3293). GARDNER ISL. (near HOOD ISL.): (no. 3294). HOOD ISL.: one of the commonest bushes, often forming thickets 5-7 ft. high. INDEFATIGABLE ISL.: Academy Bay, low bushes near the shore (no. 3295). JAMES ISL.: James Bay, forming thickets 3-6 ft. high near the shore, occasional at 1000 ft., (no. 3298). JERVIS ISL.: *Baur.* NARBOROUGH ISL.: south side, *Snodgrass and Heller.* TOWER ISL.: *Snodgrass and Heller.* "Endemic" according to Rob., l. c., who suggests that it may ultimately be identified with one of the continental species, (cf. *L. lilacina* and *L. canescens* HBK.), or segregated into several more or less distinct forms.

Lippia Houst.

L. canescens HBK. Nov. Gen. & Sp. II. 263 (1817); Rob. (1), 196.—CHARLES ISL.: common in open meadows around 1000 ft. and on the side of the main mountain at 1600 ft. (nos. 3299-3301, 3303). CHATHAM ISL.: Wreck Bay, occasional in moist shady places on the lower parts in January (no. 3302). DUNCAN ISL.: *Snodgrass and Heller.* HOOD ISL.: a few specimens were seen in a flat area in the interior of the island, which is probably the mud lake from which *Snodgrass and Heller* obtained their specimens. Further distr. S. Am.

L. rosmarinifolia Anderss. (1), 198, (2), 80; Rob. (1), 196. —ABINGDON ISL.: occasional bushes at 650 ft., common at 1300-1550 ft., (no. 3304). ALBEMARLE ISL.: Cowley Bay, occasional bushes near the shore (no. 3306); Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, bushes 5-6 ft. high on the sides of the mountain to 4000 ft. (no. 3307); Villamil, occasional bushes on lava beds near sea level (no. 3308). The specimens from this place have the leaves slightly toothed, while those from Tagus Cove have this character very strongly marked. Also noted by Robinson, l. c. JAMES ISL.: (no.

3309). NARBOROUGH ISL.: north side, occasional bushes on lava beds (no. 3310). Endemic.

L. salicifolia Anderss. (1), 198, (2), 80; Rob. (1), 196.—CHARLES ISL.: *Andersson.* Endemic.

Priva Adans

P. lappulacea (L.) Pers. Syn. Pl. II. 139 (1807). *Verbena lappulacea* L. Sp. Pl. ed. 2, 28, (1762). *P. echinata* Juss. Ann. Mus. Par. VII. 69 (1806).—CHARLES ISL.: occasional in shady places around 1000 ft. (no. 3312). Further distr. S. U. S., Mex., W. Ind., S. Am.

Stachytarpheta Vahl

S. dichotoma (Ruiz & Pavon) Vahl, Enum. I. 207 (1804). *Verbena dichotoma* Ruiz & Pavon, Fl. Per. I. 23, t. 34, fig. b (1798). *S. dichotoma* Vahl, l. c.; Rob. (1), 196.—CHARLES ISL.: common, 1000-1200 ft., occasional at 1300 ft. This plant grows very abundantly on the southeast slopes of the large craters in the interior of the island, and in such places it forms the bulk of the vegetation, (nos. 3313-3314). Further distr. S. U. S., Mex., W. Ind., S. Am.

Verbena L.

V. carolina L. Syst. ed. 10, 852 (1760); Rob. (1), 196.—JAMES ISL.: *Darwin.* Further distr. U. S., Mex., S. Am.

V. grisea Rob. & Greenm. (1), 142, 147; Rob. (1), 197.—DUNCAN ISL.: rare around 1250 ft. (nos. 3315-3316). Endemic.

V. litoralis HBK. Nov. Gen. & Sp. II. 276, t. 137 (1817); Rob. (1), 197.—ALBEMARLE ISL.: Cowley Bay, common at 2000 ft. (no. 3318); Tagus Cove, common on lava beds at 300 ft. (no. 3320); Villamil, common, 600-1400 ft., and on the floor of the crater at 2750 ft. (no. 3317). CHARLES ISL.: common in wet soil near a spring at 1000 ft. (nos. 3321-3322). CHATHAM ISL.: Wreck Bay, abundant in open country around 900 ft. (no. 3324.) Further distr. S. U. S., Mex., S. Am.

V. officinalis L. Sp. Pl. 20 (1753); Rob. (1), 197.—JAMES ISL.: *Darwin.* Widely distributed in tropical regions.

LABIATAE

Hyptis Jacq.

H. capitata Jacq. Ic. Pl. Rar. I. t. 114 (1781-1786), Col. Bot. I. 102 (1786); Rob. (1), 197.—ALBEMARLE ISL.: Villamil, occasional in open places around habitations at 650 ft. (no. 3324). CHARLES ISL.: *Edmonston.* Further distr. Mex., W. Ind., S. Am.

H. spicata ? Poit. Ann. Mus. Par. VII. 474, t. 28 (1806).—ALBEMARLE ISL.: Cowley Bay, occasional at 1200 ft., common at 2000 ft. Species doubtful, (no. 3326). Further distr. S. U. S., Mex., W. Ind., S. Am.

H. subverticillata Anderss. (1), 197, (2), 80; Rob. (1), 197. ALBEMARLE ISL.: Cowley Bay, *Andersson;* Tagus Cove, in lava crevices around 2100 ft. (no. 3325). INDEFATIGABLE ISL.: *Baur.* JAMES ISL.: James Bay, *Snodgrass and Heller.* NABROROUGH ISL.: *Snodgrass and Heller.* Endemic.

Salvia L.

S. occidentalis Sw. Prodr. 14 (1788); Rob. (1), 197.—ALBEMARLE ISL.: Iguana Cove, one of the most common herbs to 500 ft. and above (nos. 3327-3330); Tagus Cove, common around 1600 ft. (no. 3331); Villamil, common around 650 ft. (no. 3332). CHARLES ISL.: occasional at 800 ft., common at 1000-1200 ft., (nos. 3333-3334). CHATHAM ISL.: Wreck Bay, occasional in open woodland at 350 ft. (nos. 3335-3336). JAMES ISL.: James Bay, occasional in woodland at 850 ft., common at 2100 ft., (nos. 3337-3338). Further distr. Mex., W. Ind., S. Am.

S. prostrata Hook. f. (3), 200; Rob. (1), 198.—CHARLES ISL.: occasional in protected places, 1200-1550 ft., (nos. 3339-3340). JAMES ISL.: *Darwin.* Endemic.

S. tiliaefolia Vahl, Symb. III. 7 (1794); Rob. (1), 198.—CHARLES ISL.: *Darwin.* Further distr. Mex., W. Ind., S. Am.

Teucrium L.

T. inflatum Sw. Prodr. 88 (1788); Rob. (1), 198.—ALBEMARLE ISL.: Villamil, abundant above 500 ft. (no. 3341).

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Charles Isl.: common among rocks at 1450 ft. (nos. 3342-3343). Chatham Isl.: Wreck Bay, common in open places at 650 ft. (no. 3344). Further distr. Mex., W. Ind., S. Am., Polynesia.

SOLANACEAE

Acnistus Schott

A. ellipticus Hook. f. in Miers, Lond. Jour. Bot. IV. 343 (1845); Rob. (1), 198. *A. insularis* Rob. (1), 198.—Albemarle Isl.: Villamil, bushes and small trees, 1200-1500 ft., and inside of the crater at 2750 ft. Calyx 5-crenate, stigma entire, leaves as described by Hook. f., l. c., (no. 3347). Charles Isl.: small trees on the steep inner wall of the main crater at 1700 ft. Calyx 5-dentate, stigma obscurely bilobed, leaves mostly ovate and glabrous, although a few are somewhat elliptical, (no. 3347). Chatham Isl.: occasional bushes around 2000 ft. Calyx truncate, stigmas bilobed and entire on the same plant, leaves orbicular to obovate, somewhat attenuate at base, sparingly pubescent above, tomentose below, (no. 3348). Duncan Isl.: small trees at 1300 ft. Calyx somewhat truncate, obscurely dentate, stigmas entire, leaves orbicular to obovate, mostly glabrous, although some show a slight tomentum on the lower surface around the veins. Both the flowers and leaves are smaller than is usually the case in this species, a fact that may be due to the more xerophytic conditions around the top of this island where the specimens were found, (no. 3349). James Isl.: James Bay, small trees above 2200 ft. Calyx 5-crenate, stigmas bilobed and entire on the same plant, leaves agreeing with Hooker's description, l. c., (no. 3350). In consideration of the above varied characters which the more abundant material has brought to light, it seems best to combine *A. insularis* Rob. with *A. ellipticus* Hook. f. It is another instance of a very variable species, examples of which are common on the Galapagos Islands. It is hardly likely that the above variations are of formal value, as the specimens from Charles Isl. show nearly as much variation from the typical *A. ellipticus* as do the specimens from other islands. Endemic.

Brachistus, Miers

B. pubescens, nov. sp.

Fruticosus 2 dm.-1 m. altus, ramis teretibus dichotomis flavo-pubescentibus; ramulis teretibus divaricatis saepe geniculatis flavo-pubescentibus; foliis alternis ovatis acuminatis basi cuneatis integris utrinque flavo-pubescentibus petiolatis, laminis 3.2-5 cm. longis, 1.3-2.2 cm. latis; floribus axillaribus solitaribus pedunculatis; calyce pubescenti 5-angulato, 2.6 mm. lato; corolla rotata, limbo 5-lobo, lobis acutis margine denticulatis; staminibus limbo inclusis; stylo incrasato stigmate capitato integerrimo; bacca orbiculari compressa viridi 6-seminata, seminibus flavo-bruneis.

ALBEMARLE ISL.: Villamil, bushes in woodland, 450-600 ft., (nos. 3351-3352). JAMES ISL.: James Bay, occasional bushes above 1600 ft. (no. 3353). This species resembles *B. Pringlei* Watson in many respects, differing principally in the presence of a yellow tomentum on both branches and leaves, and in the absence of the linear tooth at each angle of the calyx. Plate III, figs. 6-8. Endemic.

Cacabus Bernh.

C. Hookeri (Anderss.) n. comb. *Thinogeton Hookeri* Anderss. (1), 217; Rob. (1), 201.—INDEFATIGABLE ISL.: northwest side, *Andersson.* Endemic.

C. Miersii (Hook. f.) Wettst. in Engl. & Prantl, Nat. Pflanzenf. IV. Ab. 3b, 16 (1891). *Dictocalyx Miersii* Hook. f. (3), 203. *Thinogeton Miersii* Miers, Ann. Mag. Nat. Hist. 2, IV. 359 (1849); Rob. (1), 201.—ABINGDON ISL.: occasional among rocks near the shore (no. 3417). ALBEMARLE ISL.: Black Bight, *Snodgrass and Heller;* Iguana Cove, common near the shore (no. 3418); Tagus Cove, abundant in tufaceous soil on the tops of the cliffs near the shore (no. 3420); Turtle Cove, fairly abundant on lava near the beach (no. 3419); Villamil, occasional near brackish pools several miles inland (no. 3421). BARRINGTON ISL.: *Snodgrass and Heller.* CHARLES ISL.: *Darwin; Andersson.* CHATHAM ISL.: *Andersson; Snodgrass and Heller.* CULPEPPER ISL.: *Snodgrass and Heller.* GARDNER ISL. (near HOOD ISL.): among rocks just above high tide mark (no. 3422). HOOD ISL.: occasional on sand beaches (no. 3423). NARBOROUGH ISL.: Mangrove Point, *Snodgrass and Heller;* north side, *Snodgrass and Heller.* Endemic.

Capsicum L.

C. annuum L. Sp. Pl. 188 (1753); Rob. (1), 199.—CHARLES ISL.: occasional at 450 ft., and on moist rocks at 1000 ft., (nos. 3354-3355). CHATHAM ISL.: Wreck Bay, occasional at 350 ft. (nos. 3356-3357).

Datura L.

D. Tatula L. Sp. Pl. ed. 2, 256 (1762); Rob. (1), 199.—ALBEMARLE ISL.: Villamil, occasional at sea level, common at 600 ft., (no. 3358). CHARLES ISL.: common in the vicinity of former habitations (nos. 3359-3360). Widely distributed.

D. sp.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller*.

Lycium L.

L. geniculatum Fernald, ? Proc. Am. Acad. XXXV. 566 (1900). *Nyctaginacea?* Rob. (1), 143.—DUNCAN ISL.: occasional bushes (no. 3362). HOOD ISL.: bushes 4-6 ft. high around 600 ft. (no. 3361). SEYMOUR ISL., NORTH: *Snodgrass and Heller*. Further distr. Mex.

L. sp. Rob. (1), 199.—ABINGDON ISL.: common bushes, forming thickets 2-3 ft. high near the shore, (no. 3363). ALBEMARLE ISL.: Turtle Cove, bushes near the shore (no. 3364); Villamil, common bushes on lava beds near the shore (no. 3365). CHARLES ISL.: bushes near the shore. DUNCAN ISL.: occasional bushes at 1000 ft. (no. 3366). GARDNER ISL. (near HOOD ISL.): (no. 3367). HOOD ISL.: (no. 3368). Unfortunately all of the above specimens are sterile and indeterminate as to species.

Lycopersicum Hill.

L. esculentum Mill. var. **minor** Hook. f. (3), 202; Rob. (1), 199.—ABINGDON ISL.: common, 700-1600 ft., (no. 3369). ALBEMARLE ISL.: Cowley Bay, occasional at 2100 ft. (no. 3371); Christopher Point, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, common near sea level (no. 3372). CHATHAM ISL.: Sappho Cove, occasional on recent lava (no. 3374). GARDNER ISL. (near HOOD ISL.): (no. 3373). HOOD ISL.: *Baur; Snodgrass and Heller*. INDEFATIGABLE ISL.: north side, common among rocks at 200 ft. (no. 3376); southeast side, rare at 550 ft. (no. 3375). JAMES

ISL.: James Bay, fairly abundant to 1000 ft. (nos. 3377-3378). NARBOROUGH ISL.: Mangrove Point, *Snodgrass and Heller.* Further distr. S. Am., Polynesia.

L. peruvianum (L.) Mill., var. **parviflorum** Hook. f. (3), 202; Rob. (1), 199.—CHATHAM ISL.: *Darwin.* Further distr. Andean S. Am.

L. pimpinellifolium Mill. Dict. ed. 8, no. 4 (1768); Rob. (1), 199.—ALBEMARLE ISL.: Iguana Cove, abundant on the side of the cliff above the cove (no. 3379); Villamil, common at 650 ft. (no. 3380). CHARLES ISL.: *Andersson.* CHATHAM ISL.: north side, *Darwin; Andersson.* JAMES ISL.: *Andersson.* Further distr. Andean S. Am.

L. sp. Rob. (1), 200.—CHATHAM ISL.: *Snodgrass and Heller.*

Nicotiana L.

N. glutinosa L. Sp. Pl. 181 (1753); Rob. (1), 200.—CHARLES ISL.: *Edmonston; Darwin; Andersson.* Further distr. Andean S. Am.

N. Tabacum L. Sp. Pl. 180 (1753); Rob. (1), 200.—ALBEMARLE ISL.: Iguana Cove, (no. 3383); Villamil, common in gardens and escaped from cultivation (no. 3382). CHARLES ISL.: *Chierchia.* Widely distributed through cultivation.

N. sp. Hook. f. (4), 261; Rob. (1), 200.—CHARLES ISL.: *Edmonston.*

Physalis L.

P. angulata L. Sp. Pl. 183 (1753); Rob. (1), 200.—ALBEMARLE ISL.: Villamil, fairly abundant on the lower parts (no. 3384). CHARLES ISL.: common in open country, 450-1100 ft., (nos. 3385-3386). CHATHAM ISL.: *Snodgrass and Heller.* Widely distributed.

P. ixocarpa Brot. in Hornem. Hort. Hafn. Suppl. 26 (1819); Rob. (1), 200.—ALBEMARLE ISL.: Villamil, occasional at 550 ft. (no. 3388). CHARLES ISL.: occasional near the shore (no. 3387). Widely distributed.

P. pubescens L. Sp. Pl. 183 (1753); Rob. (1), 200.—ALBEMARLE ISL.: Cowley Bay, occasional in woodland at 2100 ft.

(no. 3395); Iguana Cove, occasional in shady places at 300 ft. (no. 3392); Tagus Cove, in shady places around 900 ft. (nos. 3389, 3393); Villamil, common above 600 ft. (nos. 3390, 3396). Bindloe Isl.: *Snodgrass and Heller.* Charles Isl.: occasional in shady places near the shore (nos. 3397-3398). Chatham Isl.: Wreck Bay, occasional in shady places at 400 ft. (no. 3399). Duncan Isl.: rare around 1000 ft. (no. 3400). Hood Isl.: occasional in shady places. Indefatigable Isl.: northwest side, occasional in tufaceous soil near the shore. Dried remains, somewhat doubtful as to species, (no. 3401). James Isl.: James Bay, in shady places near the shore (nos. 3402-3403). Narborough Isl.: south side, *Snodgrass and Heller.* Further distr. U. S., Mex., W. Ind., S. Am.

P. sp.—Abingdon Isl.: dry remains at 500 ft.

Solanum L.

S. Edmonstonei Hook. f. (3), 201; Rob. (1), 201.—Charles Isl.: *Edmonston.* Endemic.

S. nigrum L. Sp. Pl. 186 (1753); Rob. (1), 201.—Abingdon Isl.: common in woodland, 1400-1550 ft., (nos. 3405-3406). Albemarle Isl.: Villamil, common, 500-1300 ft., (no. 3409). Charles Isl.: occasional among rocks at 1550 ft. (no. 3408). Chatham Isl.: Wreck Bay, abundant at 2050 ft. (no. 3407). Duncan Isl.: rare at 1275 ft. (nos. 3410-3411). James Isl.: *Scouler; Darwin;* James Bay, *Snodgrass and Heller.* Widely distributed.

S. Quitoense Lam. Ill. 16 (1793).—James Isl.: James Bay, occasional on the southeast side of the main crater at 2800 ft., *J. S. Hunter* collector, (no. 3412). Possibly an introduced species, although there has never been a permanent settlement on this island. Further distr. western S. Am.

S. verbascifolium L. Sp. Pl. 184 (1753); Rob. (1), 201.—Albemarle Isl.: Villamil, common bushes in low moist areas near sea level, small trees in open woodland at 1300 ft., bushes on the rim of the crater at 3150 ft., (nos. 3414-3416). Charles Isl.: *Andersson.* James Isl.: *Darwin.* Narborough Isl.: south side, *Snodgrass and Heller.* Widely distributed in tropical regions.

S. sp. Hook. f. (4), 261; Rob. (1), 201.—CHARLES ISL.: *Edmonston.*

S. sp. Hook. f., l. c.; Rob. (1), 201.—CHARLES ISL.: *Edmonston.*

SCROPHULARIACEAE

Bacopa Aubl.

B. monniera (L.) Wettst. in Engl. & Prantl, Nat. Pflanzenf. IV. 3b. 77 (1891). *Gratiola monniera* L. Amoen. Acad. IV. 306 (1759). *Monniera calycina* (Forsk.) O. Ktze. Rev. Gen. 462 (1891).—ALBEMARLE ISL.: Villamil, occasional at 3150 ft. (nos. 3437-3438). CHATHAM ISL.: Wreck Bay, rare at 1300 ft. (no. 3439). Further distr. U. S., Mex., W. Ind., S. Am.

Capraria L.

C. biflora L. var. **pilosa** Griseb. Fl. Brit. W. Ind. 427 (1861); Rob. (1), 202.—CHARLES ISL.: common bushes, 6-18 inches high, throughout the open brushy country, 450-1750 ft., (nos. 3425-3427). CHATHAM ISL.: Wreck Bay, common in sandy soil near the shore (nos. 3424, 3428). Further distr. S. U. S., Mex., W. Ind., S. Am.

C. peruviana Benth. in DC. Prodr. X. 430 (1846); Rob. (1), 202.—CHARLES ISL.: common bushes 4-6 ft. high, 450-1400 ft., (nos. 3429-3431). Further distr. Ecuador, Peru.

Galvezia Domb.

G. fruticosa Domb. Gmel. Syst. 937 (1791).—JERVIS ISL.: occasional near the shore and from 500-950 ft. (nos. 3440-3442). No flowering specimens were secured, so that the species is somewhat doubtful. Further distr. Peru.

Scoparia L.

S. dulcis L. Sp. Pl. 116 (1753); Rob. (1), 202.—ALBEMARLE ISL.: Cowley Bay, occasional bushes at 1800 ft. (no. 3432). CHARLES ISL.: low bushes common in open country above 1000 ft. (nos. 3433-3434). CHATHAM ISL.: Wreck

Bay, abundant in shady woodland at 250 ft. (no. 3435). JAMES ISL.: James Bay, low bushes in woodland around 2500 ft. (no. 3436). Further distr. tropical and subtropical America.

BIGNONIACEAE?

Tecoma Juss.?

T. sp.? Caruel (1), 622; Rob. (1), 202.—CHATHAM ISL.: *Chierchia.*

ACANTHACEAE

Dicliptera Juss.

D. peruviana (Lam.) Juss. Ann. Mus. Par. IX. 268 (1806). *Justicia peruviana* Lam. Dict. I. 633 (1783). *D. peruviana* Juss. l. c.; Rob. (1), 203.—JAMES ISL.: James Bay, common in shady places at 850 ft. (nos. 3443-3444). Further distr. W. S. Am.

Justicia L.

J. galapagana Lindau, in Rob. (1), 203.—ABINGDON ISL.: common, 550-1450 ft., (nos. 3445-3447). ALBEMARLE ISL.: Iguana Cove, common above 500 ft. (no. 3448); Villamil, occasional in woodland, 400-1300 ft., (nos. 3449-3452). INDEFATIGABLE ISL.: Academy Bay, common in woodland, 350-500 ft., (nos. 3454-3455). JAMES ISL.: James Bay, occasional, 350-2850 ft., (nos. 3458-3460). Endemic.

Ruellia Plum.

R. paniculata L. Sp. Pl. 635 (1753).—CHATHAM ISL.: Basso Point, occasional at 750 ft. (no. 3461). Further distr. Mex., W. Ind., S. Am.

Tetramerium Nees

T. hispidum Nees in DC. Prodr. XI. 468 (1847); Rob. (1), 204.—ALBEMARLE ISL.: Cowley Bay, common around 2000 ft. (no. 3462); Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, a few specimens on the side of the cliff above the cove (no. 3464). CHARLES ISL.: common in flat country near Post Office Bay at 200 ft., and in crevices of the lava at 650 ft., (nos. 3465-3466). CHATHAM ISL.: Wreck Bay, common in open sunny places around 200 ft. (nos. 3467-3468). INDE-

FATIGABLE ISL.: Academy Bay, occasional on the lower parts (no. 3469); north side, common above 200 ft. (no. 3470). JAMES ISL.: James Bay, fairly common at 1300 ft. (no. 3472); north side, common on lava beds on the lower parts (no. 3471). Further distr. S. U. S., Mex., S. Am.

PLANTAGINACEAE

Plantago L.

P. major L. Sp. Pl. 112 (1753); Rob. (1), 204.—ALBEMARLE ISL.: Villamil, common in swamps near the shore (no. 3473). CHARLES ISL.: occasional at 1500 ft. (no. 3474). CHATHAM ISL.: Wreck Bay, abundant, 800-1800 ft., (no. 3475). Widely distributed.

P. tomentosa var. (?) **pumila** Hook. f. (3), 194; Rob. (1), 204.—JAMES ISL.: *Darwin.* Identity doubtful, according to Rob. l. c.

RUBIACEAE

Borreria Meyer

Tardavel Adans. Fam. II. 145 (1763), and *Chenocarpus* Neck, Elem. I. 202 (1790) are doubtful synonyms of this genus.

B. basalis Anderss. (1), 191, (2), 76, t. 8, f. 4; Rob. (1), 204.—CHATHAM ISL.: *Andersson.* Endemic.

B. Baurii Rob. & Greenm. (1), 140, 146; Rob. (1), 204.—CHATHAM ISL.: Wreck Bay, *Baur.* Endemic.

B. dispersa Hook. f. (3), 217; Rob. (1), 204.—ALBEMARLE ISL.: Iguana Cove, a few specimens were found in the open vegetation at 150 ft. (no. 3476); Tagus Cove, occasional on hill-sides in tufaceous soil at 400 ft. (no. 3477). CHARLES ISL.: *Darwin; Baur.* CHATHAM ISL.: Wreck Bay, *Baur.* INDEFATIGABLE ISL.: northwest side, *Andersson.* JAMES ISL.: *Darwin.* Endemic.

B. divaricata Hook. f. (3), 219; Rob. (1), 204.—CHARLES ISL.: *Darwin; Baur.* Endemic.

B. ericaefolia Hook. f. (3), 218; Rob. (1), 205.—ABINGDON ISL.: common bushes near the shore, occasional at 1100 ft., (nos. 3478-3479). ALBEMARLE ISL.: Cowley Bay, low bushes in pumice soil at 300 ft. (no. 3480); Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, *Snodgrass and Heller;* Tagus Cove, low bushes, fairly common, 300-4000 ft., (nos. 3482-3483); Villamil, low bushes on lava near the coast (no. 3481). CHARLES ISL.: *Baur.* CHATHAM ISL.: Sappho Cove, occasional bushes on lava (no. 3484). INDEFATIGABLE ISL.: southeast side, low bushes at 600 ft. (no. 3486). JAMES ISL.: James Bay, bushes 1-3 ft. high, abundant on recent lava flows, (no. 3487). JERVIS ISL.: occasional bushes at 1050 ft. (no. 3488). NARBOROUGH ISL.: north side, occasional bushes on lava beds (no. 3489); Mangrove Point, *Snodgrass and Heller.* Endemic.

B. falcifolia Hook. f. (3), 219; Rob. (1), 205.—ALBEMARLE ISL.: *Macrae ?* acc. to Hook. f., l. c. Endemic.

B. galapageia Rob. & Greenm. (1), 140, 146; Rob. (1), 205.—DUNCAN ISL.: occasional among rocks at 1250 ft. (no. 3490). Endemic.

B. linearifolia Hook. f. (3), 217; Rob. (1), 205.—JAMES ISL.: *Darwin.* Endemic.

B. ovalis Anderss. (1), 192, (2), 76, t. 8, f. 3; Rob. (1), 205.—CHARLES ISL.: bushes among rocks near the shore (nos. 3491-3492). Endemic.

Forma **abingdonensis** Rob. (1), 205.—ABINGDON ISL.: *Baur.* Endemic.

B. pacifica Rob. & Greenm. (1), 140, 146; Rob. (1), 205.—INDEFATIGABLE ISL.: Academy Bay, common bushes near the shore (no. 3493); northwest side, *Baur.* Endemic.

B. parvifolia Hook. f. (3), 218; Rob. (1), 205.—ALBEMARLE ISL.: *Macrae.* Endemic. "A pubescent form of *B. ericaefolia?*" acc. to Rob. (1), 205.

B. perpusilla Hook. f. (3), 218; Rob. (1), 206.—JAMES ISL.: *Darwin.* Endemic.

B. rotundifolia Anderss. (2), 77; Rob. (1), 206.—INDEFATIGABLE ISL.: northwest side. *Andersson.* Endemic.

B. suberecta Hook. f. (3), 217; Rob. (1), 206.—ALBEMARLE ISL.: Iguana Cove, fairly abundant among rocks on the sides of the cliffs above the cove (nos. 3494-3495); Tagus Cove, *Snodgrass and Heller;* Villamil, on lava beds near the coast (no. 3496). BARRINGTON ISL.: *Baur.* Identity doubtful acc. to Rob. l. c. Endemic.

B. sp. Rob. (1), 206.—CHATHAM ISL.: Wreck Bay, *Snodgrass and Heller.* It is likely that some of the above species, which have not been found by more recent collectors, will prove to be synonyms of *B. ericaefolia* or some of the other more common species.

Chiococca P. Br.

C. alba (L.) Hitchc. Rep. Mo. Bot. Gard. IV. 94 (1893). *Lonicera alba* L. Sp. Pl. 175 (1753). *C. racemosa* L. Syst. ed. 10, 917 (1760); Rob. (1), 206.—ABINGDON ISL.: common bushes above 450 ft. (nos. 3497-3498). ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass and Heller;* Iguana Cove, (no. 3499); Villamil, occasional bushes on the lower parts (no. 3501). BINDLOE ISL.: *Snodgrass and Heller.* CHARLES ISL.: occasional bushes at 600 ft. (no. 3502). CHATHAM ISL.: Wreck Bay, common bushes to 500 ft. (no. 3503). DUNCAN ISL.: low bushes at 1275 ft. (no. 3504). INDEFATIGABLE ISL.: Academy Bay, bushes and small trees on the lower parts (no. 3505); southeast side, common bushes to 600 ft. (no. 3506). JAMES ISL.: James Bay, occasional bushes on the lower parts, small trees and bushes at 2150 ft., (nos. 3507-3509). NARBOROUGH ISL.: north side, occasional bushes on lava (no. 3510). Further distr. S. U. S., Mex., W. Ind., S. Am.

Coffea L.

C. arabica L. Sp. Pl. 172 (1753).—CHATHAM ISL.: Wreck Bay, in cultivated ground and escaped from cultivation (no. 3511). Coffee is exported from this island to Guayaquil, Ecuador. Widely distributed through cultivation.

Diodia L.

D. Radula (Roem. & Sch.) Cham. & Schlecht. Linnaea III. 342 (1828). *Spermacoce Radula* Roem. & Sch. Syst. III. 531 (1818). *D. Radula* Cham. & Schlecht. l. c.; Rob. (1), 206.—ALBEMARLE ISL.: Villamil, on the rim of the crater at 3150 ft. (no. 3512). CHARLES ISL.: fairly abundant at 1250 ft.

(no. 3513). Chatham Isl.: common, 900-1000 ft., (no. 3514). James Isl.: James Bay, common in moist woodland at 2100 ft. (no. 3515). Further distr. Brazil.

Psychotria L.

P. angustata Anderss. (1), 193, (2), 78, t. 9, f. 1; Rob. (1), 207.—Charles Isl.: *Darwin*. Endemic.

P. rufipes Hook. f. (3), 220; Rob. (1), 207.—Abingdon Isl.: common bushes around 1500 ft. (no. 3517). Albemarle Isl.: Iguana Cove, *Snodgrass and Heller;* Villamil, common bushes in woodland around 500 ft. Charles Isl.: occasional bushes in woodland around 1000 ft. Chatham Isl.: Wreck Bay, occasional bushes in woodland, 300-700 ft. Indefatigable Isl.: Academy Bay, bushes 5-6 ft. high above 400 ft., one of the most common bushes in the open areas around 550 ft.; northwest side, occasional bushes at 450 ft., abundant above 700 ft. James Isl.: James Bay, occasional low bushes at 900 ft., more or less abundant in woodland above this elevation, forming dense thickets around the top of the mountain at 2800 ft., (no. 3523). Endemic.

Relbunium Endl.

R. hypocarpium (L.) Hemsl.? Biolog. Cent.-Am. Bot. II. 63 (1881-1882). *Valantia hypocarpia* L. Sp. Pl. ed. 2, 149 (1763).—Charles Isl.: rare at 1300 ft. (no. 3524). The specimen is sterile but agrees closely in other respects with specimens of this species in the Gray Herbarium. It is possible that this may be the *Rubia* sp. which was collected on Charles Isl. by *Darwin* and was mentioned by Hooker f. (3), 216. Further distr. Mex., W. Ind., S. Am.

Spermacoce L.

S. tenuior L. Sp. Pl. 102 (1753); Rob. (1), 207.—Chatham Isl.: *Baur*. James Isl.: *Darwin*. Further distr. S. U. S., Mex., W. Ind., S. Am.

CUCURBITACEAE

Citrullus Neck.

C. vulgaris Schrad. ex Eckl. & Zeyh. Enum. 279 (1836); Rob. (1), 207.—Albemarle Isl.: Turtle Cove, near the shore; Villamil, in gardens. Charles Isl.: *Andersson.* Widely distributed through cultivation.

Cucurbita L.

C. Pepo L. Sp. Pl. 1010 (1753); Rob. (1), 207.—Albemarle Isl.: Villamil, in gardens. Charles Isl.: in cultivated ground, upper region, acc. to *Andersson.* Widely distributed.

Elaterium Jacq.

E. cordatum Hook. f. (3), 224; Rob. (1), 208.—Abingdon Isl.: common in woodland, 600-1600 ft., (no. 3535). Albemarle Isl.: Tagus Cove, occasional, 500-1500 ft. Chatham Isl.: Wreck Bay, abundant at 2050 ft. (no. 3536). James Isl.: *Darwin.* Endemic.

Momordica L.

M. Charantia L. Sp. Pl. 1009 (1753); Rob. (1), 208.—Albemarle Isl.: Villamil, *Baur.* Widely distributed in tropics.

Sicyos L.

S. villosus Hook. f. (3), 223; Rob. (1), 208.—Charles Isl.: *Darwin.* Endemic.

CAMPANULACEAE

Lobelia L.

L. Cliffortiana L. Sp. Pl. 931 (1753). *L. xalapensis* HBK. Nov. Gen. & Sp. III. 315 (1818); Rob. (1), 208.—Albemarle Isl.: Villamil, rare at 3150 ft. (no. 3537). Charles Isl.: occasional in moist soil at 1000 ft. (no. 3538). James Isl.: according to Hook. f. Further distr. Mex., W. Ind., S. Am.

GOODENIACEAE

Scaevola L.

S. Plumieri (L.) Vahl, Symb. II. 36 (1791). *Lobelia Plumieri* L. Sp. Pl. 929 (1753). *S. Lobelia* Murr. Syst. ed. 13, 178 (1774); Rob. (1), 208.—Albemarle Isl.: Villamil, low bushes on sand beaches (no. 3539). Charles Isl.: occasional bushes on the beach at Cormorant Bay (no. 3540). Chatham

Isl.: Basso Point, fruiting in February. Indefatigable Isl.: southeast side, bushes on the beach. Widely distributed in warm countries.

COMPOSITAE

Acanthospermum Schrank.

A. lecocarpoides Rob. & Greenm. (1), 141, 146; Rob. (1), 208.—Chatham Isl.: Sappho Cove, common bushes 3-4 ft. high in woodland at 800 ft. Except for the presence of spines on the achenes the specimens from this island are more like *Lecocarpus foliosus* than an *Acanthospermum*, (no. 700). Gardner Isl. (near Hood Isl.): common bushes 2 ft. high. Some of the specimens from this island have some of the leaves deeply cut, as do the specimens from Chatham Isl., while others have them shallowly pinnatifid, as described by Rob. & Greenm., l. c., from specimens taken on the adjacent Hood Island, (no. 701). Hood Isl.: *Baur; Snodgrass and Heller.* Endemic.

A. microcarpum Rob. (1), 208.—Charles Isl.: *Snodgrass and Heller.* Endemic.

Ageratum L.

A. conyzoides L. Sp. Pl. 839 (1753). *A. latifolium* Hemsl. Biolog. Cent.-Am. Bot. II. 82 (1881); Rob. (1), 209.—Albemarle Isl.: Villamil, common at 1800 ft. and on the southeast rim of the crater at 3150 ft. (no. 702). Charles Isl.: occasional, 1250-1550 ft., (nos. 703-705). Chatham Isl.: Wreck Bay, fairly abundant in the open grassy country around 1700 ft. (no. 706). Further distr. Costa Rica.

Ambrosia L.

A. artemisiaefolia L. Sp. Pl. 988 (1753).—Charles Isl.: abundant in a restricted area in the open bushy country at 1000 ft. (no. 708). Widely distributed.

Aplopappus Cass.

A. lanatus Hook. f. (3), 215; Rob. (1), 209.—Galapagos Ids.: *Du Petit-Thouars.* Endemic.

Baccharis L.

B. pilularis DC. Prodr. V. 407 (1836); Rob. (1), 209.—Charles Isl.: *Edmonston.* Further distr. Pacific Coast of U. S.

B. Pingraea DC. var. **angustissima** DC. Prodr. V. 420 (1836); Rob. (1), 209.—ALBEMARLE ISL.: Cowley Bay, bushes 2-3 ft. high around 1050 ft. (no. 709); Villamil, occasional bushes at 250 ft. (no. 710). INDEFATIGABLE ISL.: southeast side, low bushes at 600 ft. The specimen is sterile and doubtful as to species, (no. 710). Further distr. coast of Chili, according to Rob. l. c.

B. Steetzii Anderss. (1), 177, (2), 68; Rob. (1), 209.—CHARLES ISL.: bushes 5-8 ft. high, 1000-1200 ft., (nos. 711-712). CHATHAM ISL.: Basso Point, low bushes around 800 ft. (no. 713). Endemic.

B. sp.—JAMES ISL.: James Bay, bushes 7 ft. high. Sterile and doubtful, (no. 714).

Bidens L.

B. chilensis DC. Prodr. V. 603 (1836); Rob. (1), 210.—ALBEMARLE ISL.: Iguana Cove, occasional near the shore (no. 715); Tagus Cove, abundant in thickets at 4000 ft. (no. 716). Further distr. Chili.

B. pilosa L. Sp. Pl. 832 (1753); Rob. (1), 210.—ALBEMARLE ISL.: Cowley Bay, *Andersson;* Villamil, above 1500 ft. (no. 717). CHARLES ISL.: occasional, 1000-1400 ft., (nos. 718-720). CHATHAM ISL.: Wreck Bay, occasional at 1000 ft. (no. 721). Widely distributed in tropical regions.

B. refracta Brandegee, Zoe, I. 310 (1890); Rob. (1), 210.—ALBEMARLE ISL.: Iguana Cove, abundant in open places at 200 ft. (no. 743); Tagus Cove, common on the lower parts (no. 742). CHARLES ISL.: common on the lower parts (no. 744). CHATHAM ISL.: Wreck Bay, abundant in open woodland at 1000 ft. (no. 745). HOOD ISL.: *Snodgrass and Heller.* JAMES ISL.: James Bay, common on the lower parts of the island (no. 746). NARBOROUGH ISL.: south side, *Snodgrass and Heller.* Further distr. Mex.

Blainvillea Cass.

B. dichotoma (Murr.) Cass. acc. to Hemsl. Biolog. Cent.-Am. Bot. IV. 112 (1886-1888). *Verbesina dichotoma* Murr. Comm. Goett. II. 15, t. 4 (1779). *B. rhomboidea* Cass. Dict. XXIX. 493 (1823); Rob. (1), 210.—ABINGDON ISL.: common on the lower parts (no. 747). ALBEMARLE ISL.: Iguana Cove, common in woodland (no. 748); Tagus Cove, common on the lower parts, rare at 3500 ft., (no. 749). BARRINGTON ISL.: *Snodgrass and Heller.* CHARLES ISL.: common in open bushy country, 450-1000 ft., (nos. 751-752). CHATHAM ISL.: Wreck Bay, abundant at 250 ft. (no. 753). DUNCAN ISL.: *Baur.* HOOD ISL.: (no. 754). INDEFATIGABLE ISL.: north side, *Snodgrass and Heller;* northwest side, *Andersson.* JAMES ISL.: James Bay, abundant near the shore (no. 755). NARBOROUGH ISL.: south side, *Snodgrass and Heller.* SEYMOUR ISL., NORTH: *Snodgrass and Heller.* The fact that this plant occurs on such a remote and unfrequented island as Abingdon would seem to show that it was not a recent introduction as suggested by Rob. l. c. Widely distributed in tropical regions.

B. tenuicaulis Benth. & Hook. f. Gen. Pl. II. 370 (1873-1876); Rob. (1), 211.—ALBEMARLE ISL.: *Macrae.* CHARLES ISL.: *Edmonston.* Identity doubtful according to Rob. l. c. Endemic.

Brickellia Ell.

B. diffusa (Vahl.) A. Gray, Pl. Wright. I. 86 (1852). *Eupatorium diffusum* Vahl, Symb. III. 94 (1794). *B. diffusa* Gray, l. c.; Rob. (1), 211.—ALBEMARLE ISL.: Iguana Cove, common near the shore (nos. 757-758); Tagus Cove, common to 1800 ft. (no. 756). Further distr. Mex., W. Ind., S. Am.

Chrysanthellum Rich.

C. erectum Anderss. (1), 188, (2), 74; Rob. (1), 211.—CHATHAM ISL.: *A. Agassiz; Snodgrass and Heller.* INDEFATIGABLE ISL.: northwest side, *Andersson.* NARBOROUGH ISL.: south side, *Snodgrass and Heller.* Endemic.

C. pusillum Hook. f. (3), 214; Rob. (1), 211.—ALBEMARLE ISL.: *Darwin.* CHARLES ISL.: common, 700-1000 ft., occasional, 1700 ft., (nos. 759-760). CHATHAM ISL.: Wreck Bay, occasional in dry sandy soil near the shore (no. 761). Endemic.

Eclipta L.

E. erecta L. Mant. II. 286 (1771); Rob. (1), 211.—CHARLES ISL.: occasional on moist shady rocks at 1000 ft.

(no. 764). CHATHAM ISL.: Wreck Bay, common in open grassy country above 800 ft. (nos. 762-763). HOOD ISL.: *Snodgrass and Heller.* Widely distributed.

Elvira Cass.

E. inelegans (Hook. f.) Rob. (1), 212. *Desmocephalum inelegans* Hook. f. (3), 209.—CHARLES ISL.: *Darwin.* Endemic.

E. repens (Hook. f.) Rob. (1), 212. *Microcoecia repens* Hook. f. (3), 209.—ALBEMARLE ISL.: Tagus Cove, *Snodgrass and Heller.* JAMES ISL.: *Darwin.* Endemic.

Encelia Adans.

E. hispida Anderss. (1), 186, (2), 73; Rob. (1), 212.—BARRINGTON ISL.: common bushes, 2-3 ft. high, (no. 722). CHARLES ISL.: *Andersson.* CHATHAM ISL.: north side, *Andersson.* Endemic.

Erigeron L.

E. lancifolius Hook. f. (3), 208; Rob. (1), 212.—ALBEMARLE ISL.: Christopher Point, *Snodgrass and Heller;* Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, spreading bushes 3-4 ft. high, abundant on lava beds and tufa deposits above 500 ft., (no. 723). NARBOROUGH ISL.: south side, *Snodgrass and Heller.* The involucral bracts of this species vary from glabrous to pilose. Endemic.

Var. **glabriusculus** var. nov.

Foliis lanceolatis, sparsa glabriusculus subtus tomentosis, marginibus recurvis, remotis denticulatis.

ALBEMARLE ISL.: Villamil, bushes 3-4 ft. high on the rim of the crater at 3150 ft. (no. 724). Endemic.

E. linifolius Willd. Sp. III. 1955 (1804); Rob. (1), 212.—ALBEMARLE ISL.: Villamil, occasional in open grassy country above 1800 ft. (no. 725). CHARLES ISL.: common in open places at 1250 ft., occasional at 1650 ft., (nos. 726-727). CHATHAM ISL.: Wreck Bay, common in grassy country around 1400 ft. (no. 728). Widely distributed in warm countries.

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E. tenuifolius Hook. f. (3), 207; Rob. (1), 212.—ABINGDON ISL.: common bushes 3-4 ft. high, 600-1650 ft., (nos. 729-730). ALBEMARLE ISL.: Cowley Bay, low bushes on pumice soil, 600-2000 ft., (no. 731); Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, common bushes on lava beds and in woodland below 550 ft. (no. 732). CHARLES ISL.: common bushes, 800-1400 ft., one of the commonest bushes in the wooded area around 1000 ft., (nos. 733-734). DUNCAN ISL.: common bushes around 1000 ft. The specimen has short linear leaves and differs considerably in appearance from the specimen collected on this island by *Baur,* (no. 735). INDEFATIGABLE ISL.: northwest side, rare in woodland at 850 ft. (no. 738); southeast side, bushes 6-8 ft. high in woodland, 450-650 ft., (nos. 736-737). JAMES ISL.: James Bay, common bushes on the edges of lava fields around 450 ft. The specimen from this place has the bracts of the involucre slightly tomentose, (no. 739). This species shows a considerable variation in the length and pubescence of the leaves, in some instances on specimens from the same island, but the floral characters are fairly constant throughout. Endemic.

Variety **tomentosus** nov. var.

Foliis angustė acuminatis, marginibus recurvis supra subglaberrimis vel pilosis subtus tomentosis, 2.5-7.5 cm. longis, 1 mm. latis; involucris squamis oblongis vel linearibus exterioribus tomentosis.

JAMES ISL.: James Bay, bushes 4-7 ft. high above 900 ft. One of the commonest bushes in the forests of *Scalesia pedunculata* on the upper parts of the island, (nos. 740-741). Endemic.

Eupatorium L.

E. filicaule Sch. Bip. in Gray, Proc. Am. Acad. XXI. 384 (1886); Rob. (1), 213.—ALBEMARLE ISL.: Cowley Bay, common bushes at 2000 ft. (no. 630); Iguana Cove, *Snodgrass and Heller.* INDEFATIGABLE ISL.: Academy Bay, abundant in a dense growth of vines and bushes, 450-650 ft., (nos. 626-629). Further distr. Mex., W. S. Am.

E. ? sp. Hook. f. (4), 261; Rob. (1), 213.—CHARLES ISL.: *Edmonston.* Endemic.

E. sp.—ALBEMARLE ISL.: Iguana Cove, bushes to 400 ft. The specimen is too immature for accurate determination, but it differs from *E. filicaule* in the looser inflorescence, the longer and stiffer panicles, and in the more filiform involucral bracts, (no. 631).

Flaveria Juss.

F. bidentis (L.) O. Kuntze, Rev. Gen. III. pt. 2, 148 (1893). *Ethulia bidentis* L. Mant. I. 110 (1767). *Milleria Contrayerba* Cav. Ic. Pl. I. t. 4 (1791). *F. Contrayerba* Pers. Syn. II. 489 (1807); Rob. (1), 213.—CHARLES ISL.: *Andersson.* Further distr. S. U. S., Mex., S. Am.

Gnaphalium L.

G. luteo-album L. Sp. Pl. 851 (1753).—ALBEMARLE ISL.: Villamil, forming large patches on the floor of the crater at 2750 ft. and on the southeast rim of the crater at 3150 ft. The specimens from the floor of the crater have the leaves smaller and more closely arranged and the tomentum more copious than do the specimens from the rim, a fact which may be due to the more xerophytic conditions inside of the crater, (nos. 632-633). Widely distributed in warm countries.

Hemizonia DC.

H. squalida Hook. f. (3), 208; Rob. (1), 213.—GALAPAGOS IDS.: *Du Petit-Thouars.* Endemic.

Jaegeria HBK.

J. gracilis Hook. f. (3), 213; Rob. (1), 213.—CHARLES ISL.: *Darwin.* Endemic. Rob. l. c. suggests that this can hardly be a *Jaegeria.*

J. hirta (Lag.) Lees. Syn. Gen. Comp. 223 (1832). *Acmella hirta* Lag. Nov. Gen. & Sp. 31 (1815).—ALBEMARLE ISL.: Tagus Cove, abundant at 4000 ft. (no. 635); Villamil, common in grassy country above 1500 ft. (no. 634). CHATHAM ISL.: Wreck Bay, abundant in moist places, 1700-2050 ft., (nos. 636-637). Further distr. Mex., S. Am.

J. prorepens Hook. f. (3), 214; Rob. (1), 213.—JAMES ISL.: *Darwin.* Endemic.

Lecocarpus Decaisne

L. pinnatifidus Decaisne, Bot. Voy. Venus, Atlas t. 14 (1846). *L. foliosus* Decaisne, op. c., text, 20 (1864); Rob. (1), 213.—CHARLES ISL.: low bushes, abundant in open places among lava boulders near the shore and up to 700 ft. (nos. 638-639). CHATHAM ISL.: *Darwin.* Endemic.

Lipochaeta DC.

L. laricifolia (Hook. f.) Gray, Proc. Am. Acad. V. 131 (1862). *Macraea laricifolia* Hook. f. (3), 210. *L. laricifolia* Gray, l. c.; Rob. (1), 214.—ABINGDON ISL.: occasional bushes, 700-1000 ft., (no. 640). ALBEMARLE ISL.: Cowley Bay, occasional stunted bushes in the vicinity of the shore, bushes 3-4 ft. high, 300-2000 ft.; Tagus Cove, common bushes on tufaceous soil near the shore and on the sides of the mountain. Above 2500 ft. it is by far the most predominant species, (no. 642); Villamil, occasional bushes, 75-600 ft., (no. 641). CHARLES ISL.: occasional clumps of bushes near the shore, abundant in scattering bunches, 450-1000 ft., and forming dense thickets of bushes 6-8 ft. high, 1000-1450 ft., except on the windward sides of the craters, where it does not occur above 1200 ft., (no. 643). CHATHAM ISL.: Basso Point, bushes at 800 ft.; Wreck Bay, common bushes at 450 ft. (no. 644). INDEFATIGABLE ISL.: southeast side, common bushes at 600 ft. JAMES ISL.: James Bay, bushes 6-8 ft. high on the edges of recent lava flows at 850 ft. (no. 645); northeast side, abundant above 225 ft. NARBOROUGH ISL.: south side, *Snodgrass and Heller.* Endemic.

Pectis L.

P. Anderssonii Rob. (1), 214. *P. linearis* Rob. & Greenm. (1), 147, not La Llave. *Lorentia linearis* Anderss. (1), 174, (2), 66.—INDEFATIGABLE ISL.: northwest side, abundant in dry open areas below 300 ft. (no. 646). Endemic.

P. Hookeri Rob. (1), 214. *Lorentia gracilis* Hook. f. (3), 206.—ALBEMARLE ISL.: Tagus Cove, fairly abundant on the tops of tufa cliffs (no. 648). BARRINGTON ISL.: *Baur; Snodgrass and Heller.* CHARLES ISL.: in crevices of the lava near the shore (no. 647). HOOD ISL.: *Snodgrass and Heller.*

James Isl.: James Bay, *Snodgrass and Heller.* Jervis Isl.: *Baur.* Narborough Isl.: north side, occasional on lava beds (no. 649). Seymour Isl., south: *Snodgrass and Heller.* Endemic.

P. linifolia L. Syst. Nat. ed. 10, 1221 (1760); Rob. (1), 215.—Chatham Isl.: north side, *Andersson.* Indefatigable Isl.: northwest side, *Andersson.* Seymour Isl., south: *Snodgrass and Heller.* Further distr. Mex., W. Ind., N. S. Am.

P. subsquarrosa (Hook. f.) Sch. Bip. in Seem. Bot. Herald, 309 (1852-1857). *Lorentia subsquarrosa* Hook. f. (3), 206. *P. squarrosa* Sch. l. c.; Rob. (1), 215.—Galapagos Ids.: *Habel.* Chatham Isl.: north side, *Darwin.* Endemic.

P. tenuifolia (DC.) Sch. Bip. in Seem. Bot. Herald, 309 (1852-1857). *Lorentia tenuifolia* DC. Prodr. V. 103 (1836). *P. tenuifolia* Sch. l. c.; Rob. (1), 215.—Albemarle Isl.: Black Bight, *Snodgrass and Heller;* Cowley Bay, common in pumice soil on the lower parts (no. 651); Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, common on the tufa hills around the cove (no. 650); Villamil, common in lava crevices near the coast (no. 652). Charles Isl.: *Andersson; Snodgrass and Heller.* Chatham Isl.: Basso Point, occasional in lava crevices (no. 653); Wreck Bay, *Snodgrass and Heller.* Indefatigable Isl.: north side, in lava crevices near the beach (no. 654). Narborough Isl.: (no. 655). Seymour Isl., north: *Snodgrass and Heller.* Further distr. shores of Peru ? according to Robinson. l. c.

Porophyllum Vaill.

P. ruderale (Jacq.) Cass. Dict. XLIII. 56 (1826). *Kleinia ruderalis* Jacq. Enum. 28 (1762). *P. ellipticum* Cass. l. c.; Rob. (1), 215.—Abingdon Isl.: *Snodgrass and Heller.* Albemarle Isl.: Tagus Cove, abundant in tufaceous soil on the lower parts (no. 656). Charles Isl.: rare among rocks near the shore (no. 658). Chatham Isl.: Basso Point, occasional on recent lava (no. 659). Duncan Isl.: *Snodgrass and Heller.* Hood Isl.: *Baur; Snodgrass and Heller.* Indefatigable Isl.: northwest side, common on the lower parts (no. 660); north side, *Snodgrass and Heller.* JAMES ISL.: James Bay, *Snodgrass and Heller;* Orchilla Bay, *Baur.* JERVIS ISL.: *Baur.* Further distr. Mex., W. Ind., S. Am.

Scalesia Arn.

S. affinis Hook. f. (3), 212; Rob. (1), 216.—CHARLES ISL.: bushes 5-6 ft. high at 550 ft. (no. 661). INDEFATIGABLE ISL.: southeast side, bushes 7-10 ft. high around 600 ft. (no. 662). Endemic.

S. affinis Anderss. (1), 180, (2), 70, t. 7, f. 3; Rob. (1), 216.—INDEFATIGABLE ISL.: north side, low bushes 2-3 ft. high in lava crevices near the coast (no. 665); northwest side, low bushes near the shore (no. 664); southeast side, occasional bushes in the vicinity of the shore (no. 663). Endemic.

S. atractyloides Arn. in Lindl. Introd. Nat. Ord. ed. 2, 264, 443 (1836); Rob. (1), 216.—JAMES ISL.: James Bay, bushes 5-7 ft. high on the borders of recent lava flows, where it often grows to the exclusion of all other large vegetation, (no. 666); northeast side, bushes 4-8 ft. high on lava beds near the coast and above 700 ft. The leaves of the specimens from this locality are more scabrous and less pubescent on the lower surface than are the specimens taken in the vicinity of James Bay. The specimens agree with the rather brief description of this species, except that the heads are considerably smaller, (no. 667). Endemic.

S. Baurii Rob. & Greenm. (1), 141, 146; Rob. (1), 216.—DUNCAN ISL.: abundant bushes on the upper parts of the island (no. 668). Endemic.

Var. (?) **glabrata** Rob. (1), 216.—DUNCAN ISL.: *Snodgrass and Heller.* Endemic.

S. cordata nov. sp.

Arborescens circa 9 m. alta; ramulis teretibus griseis puberulis; foliis ovatis subintegerrimis attenuato-acutissimis penninervis basi cordatis supra hispidis subtus puberulis, lamina 8.8 cm. longa, 4.8 cm. lata; petiolis gracilibus puberulis 4.7 cm. longis; capitulis pluribus gummiferis corymbosis; squamis involucri campanulati angustis lanceolatis acutis hispidis; paleis conduplicatis glaberrimis argute 3-dentatis; acheniis compressis oblongis glaberrimis 3 cm. longis, 1. mm. latis, nigris cum maculatis griseis variegatis 2-dentatis, dentibus subequalibus.

Closely related to *S. microcephala* Rob., differing in the size and shape of the leaves, the broader involucral bracts, and in the variegated and glabrous achenes. The specimen is too mature to show good floral characters. *S.* n. sp.? Rob. (1), 220.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, occasional trees at 175 ft., abundant at 250-600 ft., smaller and less abundant at 1300 ft. So far as is known this is the only arborescent species of *Scalesia* found on this island, (no. 669). Plate IV, figs. 4-6. Endemic.

S. Darwinii Hook. f. (3), 211; Rob. (1), 216.—JAMES ISL.: James Bay, small trees 8-10 ft. high around 1000 ft. Concerning this species Hook. f., l. c., remarks as follows: "Characteristic of the vegetation of James Isl., forming woods of straight trees in the alpine or damp region.—Darwin, Ms." Darwin evidently meant this statement to apply to *S. pedunculata,* as it is the only species of *Scalesia* that forms trees on this island, (no. 670). Endemic.

S. decurrens Anderss. (1), 182, (2), 71; Rob. (1), 216.—ALBEMARLE ISL.: *Baur.* CHARLES ISL.: low bushes abundant in barren rocky places in the vicinity of the shore. The low *Scalesia* bushes figured in Agassiz (1), Pl. XX, belong to this species. Endemic.

S. divisa Anderss. (1), 179, (2), 70, t. 7, f. 1; Rob. (1), 217.—CHATHAM ISL.: Sappho Cove, bushes 2-4 ft. high on lava beds near the coast (no. 672). Endemic.

S. gummifera Hook. f. (3), 212; Rob. (1), 217.—ALBEMARLE ISL.: Cowley Bay, bushes from the vicinity of the shore and to 1200 ft. (no. 673); Elizabeth Bay, *Snodgrass and Heller;* Tagus Cove, *Snodgrass and Heller;* Villamil, bushes 3-6 ft. high in shady places, and on lava beds below 100 ft., (no. 674). INDEFATIGABLE ISL.: Academy Bay, bushes in woodland below 100 ft., species somewhat in doubt. Endemic.

S. Helleri Rob. (1), 217.—BARRINGTON ISL.: occasional bushes 6-8 ft. high all over the island (no. 675). Endemic.

S. Hopkinsii Rob. (1), 217.—ABINGDON ISL.: common bushes 6-8 ft. high from the vicinity of the shore to 1500 ft.

They are much less abundant on the southwest side and do not extend below 500 ft. Specimens from near the shore have smaller and more closely arranged leaves than do the specimens from above 1000 ft., (nos. 676-677). Endemic.

S. incisa Hook. f. (3), 210; Rob. (1), 217.—CHATHAM ISL.: *Darwin.* Endemic.

S. microcephala Rob. (1), 218.—ALBEMARLE ISL.: Cowley Bay, bushes and low trees, 1200-1650 ft., (no. 679); Tagus Cove, common bushes above 1200 ft. (no. 678). NARBOROUGH ISL.: south side, *Snodgrass and Heller.* Endemic.

S. narbonensis Rob. (1), 218, Pl. 3, figs. 4-7.—NARBOROUGH ISL.: north side, bushes 2-3 ft. high, abundant on lava beds near the coast, (no. 680); south side, *Snodgrass and Heller.* Endemic.

S. ovata Anderss. (1), 181, (2), 70; Rob. (1), 219.—CHARLES ISL.: *Andersson; Lee.* Endemic.

S. pedunculata Hook. f. (3), 211; Rob. (1), 219.—CHARLES ISL.: trees with umbrella-shaped crowns, on exposures of basaltic lava, 1000-1200 ft. The most common forest tree in the upper regions, (no. 681). CHATHAM ISL.: Wreck Bay, low spreading trees, abundant above 600 ft., (no. 684). INDEFATIGABLE ISL.: Academy Bay, forms dense forests of trees 40-60 ft. high, 400 to probably 1500 ft. This species attains its largest size at this place, (nos. 685-686); northwest side, trees 20-30 ft. high above 700 ft. (no. 678); southeast side, trees 15-20 ft. high above 450 ft. It apparently extends up higher at this place than at Academy Bay, (nos. 689-690). JAMES ISL.: James Bay, trees 25-40 ft. high above 950 ft. (no. 688). This species forms the *Scalesia* forests, on all the islands where such forests occur, except on Albemarle. Endemic.

S. retroflexa Hemsl. in Hook. f. Ic. Pl. XXVIII. t. 2715 (1901); Rob. (1), 219.—INDEFATIGABLE ISL.: *Habel.* Endemic.

S. Snodgrassii Rob. (1), 219, Pl. 3, fig. 8.—WENMAN ISL.: bushes 2-3 ft. high on sides of cliffs (no. 691). Endemic.

S. villosa nov. sp.

Fruticosa circa 2 m. alta; ramulis teretibus bruneis griseo-punctatis ad apices sericeo-villosis; foliis ad apices ramulorum confertis lanceolatis integerrimis longe attenuatis basi cuneatis utrinque sericeo-villosis sessilibus 9.3 cm. longis, 1.4 cm. latis; capitulis subglobosis multifloris 2.7 cm. latis longe-pedunculatis; pedunculis bruneo-puberulis 6.7 cm. longis; squamis involucri lanceolatis 8 mm. longis sericeo-villosis; paleis conduplicatis carinatis apice puberulis 3-dentatis; acheniis oblongis compressis glaberrimis bruneo-griseis 4 mm. longis, 2 mm. latis; corollis ignotis.

S. Darwinii Rob. (1), 216, not Hook. f., Type no. 107 Gray Herbarium.—Charles Isl.: common bushes in the vicinity of the shore at Cormorant Bay, and in the interior of the island at 550 ft., (no. 692). Plate IV, figs. 1-3. Endemic.

Var. **championensis** nov. var.

Foliis revolutis utrinque sparse villosis 8.3 cm. longis, 1.8 cm. latis.

Champion Isl.: *J. R. Slevin* collector (no. 1025). Endemic.

S. sp.—Culpepper Isl.: bushes, evidently of a species of *Scalesia,* were noticed on the upper and inaccessible parts of the island. The bushes were of about the same size as those of *S. Snodgrassii* on Wenman Isl. Endemic.

Sonchus L.

S. oleraceus L. Sp. Pl. 794 (1753); Rob. (1), 220.—Albemarle Isl.: Iguana Cove, abundant among rocks near the shore (no. 694); Tagus Cove, common at 4000 ft. (no. 695); Villamil, common at 700 ft., occasional at 1300 ft., (no. 693). Charles Isl.: occasional among rocks at 1550 ft. (no. 696). Chatham Isl.: Wreck Bay, common, 800-1200 ft., (nos. 697-698). Widely distributed.

Spilanthes L.

S. Acmella Murr. Syst. ed. 13, 610 (1774); Rob. (1), 220.—Charles Isl.: *Edmonston.* Narborough Isl.: south side, *Snodgrass and Heller.* Widely distributed in tropics.

S. diffusa Hook. f. (3), 214; Rob. (1), 220.—Charles Isl.: in moist places at 1700 ft. (no. 699). James Isl.: *Darwin.* Endemic.

Tagetes L.

T. erecta L. Sp. Pl. 887 (1753); Rob. (1), 220.—Chatham Isl.: *Chierchia.* Widely distributed.

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS

The sign + indicates that a specimen has been examined from the island in question; the sign — that a record of occurrence has been found. The abbreviations: "Gardner Ch." and "Gardner Hd." designate respectively Gardner Island near Charles Island and Gardner Island near Hood Island.

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
FILICES																				
Acrostichum aureum			+																	
Adiantum æthiopicum	—																			
Alarconianum	—																			
concinnum		+	+				+								+		+			
diaphanum			+																	
Henslovianum			+				—	+						+	+					
macrophyllum			+											+	+					
parvulum							—													
patens	—																			
petiolatum								—						+						
tetraphyllum								—												
Anogramma chærophylla							—													
leptophylla							+													
Aspidium martinicense			+												+					

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Asplenium anisophyllum var. latifolium	—														—					
cristatum		+	+					+						+	+					
formosum		+	+				+	+						+	+		+			
lætum								—												
lunulatum							+													
myriophyllum															—					
præmorsum			+											+	+		+			
pumilum							+							+						
rutaceum	—																			
Serra			+					+		+					+					
serratum								—												
sulcatum		+	+				+	+						—	—					
var. macilentum	—																			
Blechnum blechnoides								+												
occidentale		+	+				+	+		+					+					
var. caudatum	—																			
Ceropteris tartarea			+		+		+	+		+					+					

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Cheilanthes microphylla		+	+				+	+						+						
myriophylla			+																	
Cyclopeltis semicordata	—																			
Cystopteris fragilis							—													
Doryopteris concolor	—																			
pedata		+	+				+	+						+	+					
Dryopteris brachyodus	—																			
furcata			+				+	+						+	+					
parasitica			+				+	+		+					+					
pseudotetragona														+						
reticulata														+						
rudis	—																			
tricholepis								+							+					
villosa								—												
Elaphoglossum muscosum			+												—					
petiolatum															—					
Gleichenia linearis								+		+										

Table Showing the Distribution of Pteridophytes and Spermatophytes upon the Galapagos Islands
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Hemitelia multiflora			+					+							+					
Histiopteris incisa		+	+												+					
Hymenophyllum hirsutum								+												
polyanthos										+										
Hypolepis repens	—																			
Nephrolepis biserrata		+	+		+										+					+
pectinata		+	+					+		+				+	+					
Notholaena sulphurea			+												+		+			
Polypodium angustifolium															+					
aureum			+							+					+					
crassifolium			+											+						
lanceolatum		+	+				+			+				+	—					
lepidopteris			+							+				+	+					
loriceum	—																			
pectinatum		+	+				+	+						+	+					
percussum	—																			
Phyllitides		—	—												+					

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
pleiosorum															—					
polypodioides			+				+							+						
squamatum		+	+		+		+	+		+			+	+	+	+	+			
thyssanolepis			+												+					
Polystichum aculeatum			+																	
adiantiforme			+												—					
apiifolium															+					
Pteris aquilina var. esculenta		+	+					+												
propinqua var. Cumingiana	—																			
Trachypteris pinnata		+	+				+	+						+	+		+			
Trichomanes pusillum															+					
Vittaria angustifolia	—																			
SALVINIACEAE																				
Azolla caroliniana							+	+												
Salvinia sp							—													
EQUISETACEAE																				
Equisetum bogotense			+																	

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
LYCOPODIACEAE																				
Lycopodium clavatum								+							+					
complanatum			+																	
dichotomum			+											+						
reflexum			+																	
taxifolium							+								+					
POTAMOGETONACEAE																				
Potamogeton pectinatus			+																	
Ruppia maritima			+																	
NAJADACEAE																				
Najas marina var. latifolia			+																	
GRAMINEAE																				
Ammophila arenaria																		+		
Anthephora hermaphrodita			+				+	+						—	+					
Aristida divulsa		+			+			+							+					
repens															—					

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
subspicata		+	+	+	+	+	+	+				+	+	+	+		+	+		
villosa										+						+				
Bouteloua pilosa		+	+	+				—						+	+	+	+	+		
Cenchrus distichophyllus			+					+					+							
granularis			+				+	+									+	+		
platyacanthus		+	+	+	+	+	+	+				+	+	+	+		+			
sp								+												
Chloris anisopoda							+							+						
elegans							+											+		
radiata							+													
Dactyloctenium aegyptium							+	+					+	+						
Digitaria sanguinalis							+	+												
Eleusine indica							+	+												
Eragrostis bahiensis		+	+																	
ciliaris		+	+		+		+	+					+		+		+		+	
megastachya				+		+	+	+		+		+	+	+				+	+	+
pilosa															+					

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Eriochloa distachya								+												
punctata								+												
Leptochloa albemarlensis		+	+																	
filiformis										+								+		
Lindleyana		+	+		+			—									+			
mucronata				+								+	+							
virgata							+	+												
Oplismenus setarius								+												
Panicum colonum							—													
fasciculatum			+				+	+						+	+					
geminatum							+	+		+			+							
hirticaulum				+			—	+				+	+	+						
var. minus							+	—												
molle								—												
multiculmum			+	+			+	+		+		+	+							
serotinum							—													
sp							+													

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
sp								+												
sp										+										
Paspalum canescens			+		+		+	+									+			
conjugatum			+				+	+							+					
distichum															+					
penicillatum							—													
scrobiculatum								—												
sp														+						
Pennisetum exalatum			+														+?			
Setaria floriana							—													
setosa			+	+			+	+		+			+	+	+		+			
sp			—																	
Sporobolus domingensis		+	+										+							
indicus			+				+	+												
virginicus			+				+	+						+	+					
Stenotaphrum secundatum			+					+												
Stipa rostrata							+	+												

Table Showing the Distribution of Pteridophytes and Spermatophytes upon the Galapagos Islands
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Cyperaceae																				
Cyperus aristatus			+				—	+							—		+			
brachystachys		+	+				—	+		+					+	+			+	
confertus			+		+		+	+		+			+	—	—					
esculentus			+					+												
galapagensis								—												
grandifolius							+	+												
laevigatus			+											+						
ligularis			+		+									+						
Mutisii		+	+		+		+	+				+		+			+	+	+?	+
polystachyus								+												
rotundus			—																	
rubiginosus				+			—	+		+										
var. cornutus				+			+	+		+			+					+		
strigosus							—	—												
suranimensis								+							—					
tristachyus								+												

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS

Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
sp.																	+			
sp.																				+
sp.				+																
Dichronema colorata								+												
Eleocharis capitata			+					+												
fistulosa								+												
mutata			+																	
Fimbristylis capillaris			+		+		+										+			
diphylla													+							
Hemicarpha micrantha								+												
Kyllinga pumila							+	+												
Scleria pterota								+												
LEMNACEAE																				
Lemna minor			+					+												
sp.							—													
BROMELIACEAE																				
Tillandsia insularis			+				+	+		+				+	+		—			

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
COMMELINACEAE																				
Commelina nudiflora		+	+				+	+		+				+	+					
Commelinacea							—													
IRIDACEAE																				
Iris sp.			+																	
CANNACEAE																				
Canna sp.			+											—	+					
AMARYLLIDACEAE																				
Furcraea cubensis			+				+	+						+						
Hypoxis decumbens			+				+	+												
sp.		—																		
ORCHIDACEAE																				
Epidendrum spicatum		+	+				+								+					
Eulophia sp.														+						
Ionopsis utricularioides			+				+			+				+	+					
Ponthieva maculata															+					

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
PIPERACEAE																				
Peperomia flagelliformis															—					
galapagensis		+	+							+				+	+					
galioides		+	+					+						+						
obtusilimba							+													
petiolata															—					
ramulosa							+													
Snodgrassii			+																	
Stewartii		+	+				+							+	+					
n. sp			+																	
sp								+												
URTICACEAE																				
Fleurya æstuans		+	+				+	+		+			+	+	—		+			
Parietaria debilis			+				+								—					
Pilea Baurii		+					+	+							+					
microphylla															—					
peploides			+				+	+							—					

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Urera alceaefolia			+											+	+					
LORANTHACEAE																				
Phoradendron florianum							—													
galapageium								—												
Henslovii		+	+				+	+		+				+	+	+				
uncinatum																	+			
POLYGONACEAE																				
Polygonum acre								+												
acuminatum	—?																			
galapagense			+					+												
CHENOPODIACEAE																				
Atriplex sp														+				+		
sp																				+
Salicornia? sp															+					
AMARANTACEAE																				
Alternanthera radicata							+	+					+							
rigida															+					

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
subscaposa			—				—			+										
Amaranthus caracasanus			+				+	+						—						
celosioides							—	—												
sclerantoides				+			+	+									+			
forma abingdonensis		+																		
forma albemarlensis			+																	
forma chathamensis								+												
forma hoodensis												+	+							
spinosus							—													
squamulatus			+				+	+		+				+	+	+		+		
urceolatus														—						
viridis			+	+				+												
Froelichia juncea			+											+						
lanigera			+							+							+			
nudicaulis							+	—												
scoparia															+		+			
Iresine Edmonstonei							—													

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS

Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Pleuropetalum Darwinii			+												+					
Telanthera ecinocephala		+	+	+			+	+		+		+	+	+	+					
filifolia															|					
flavicoma		+	+				|	+				+	+	+	+					
galapagensis											+									
glaucescens							|	+												
halimifolia			+					+						+						
Helleri									+											
var. obtusior																				+
nudicaulis		+	+			+	+	+		+				+	+	+				
rugulosa								+												
Snodgrassii			+												+			+		
strictiuscula			+				+	+						+			+			
vestita														+						
BATIDACEAE																				
Batis maritima							+	+						+	+			+		

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
BASELLACEAE																				
Boussingaultia baselloides							+			+										
PHYTOLACCACEAE																				
Phytolacca octandra			+												+					
Rivina humilis			+											+	+					
NYCTAGINACEAE																				
Boerhaavia erecta			+				+	+						—						
paniculata			+												—		+			
scandens			+				+	+		+				+	+					
viscosa		+	+			+	+	+				+	+	+	+					
Cryptocarpus pyriformis		+	+	+	+		+	+		+		+	+	+	+	+	+	+		
Mirabilis Jalapa			+																	
Pisonia floribunda		+	+				+			+				+	+					
AIZOACEAE																				
Mollugo flavescens			+				+	+						+						
var. floriana							+													
gracillima			+			+	+	+		+					+		+			+

Table Showing the Distribution of Pteridophytes and Spermatophytes upon the Galapagos Islands
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Snodgrassii			+														+			
Sesuvium Edmonstonei				+		+	+		+	+		+	+					+		
Portulacastrum		+	+	+			+	+						—	—			+		
Trianthema Portulacastrum			+	+			+	+		+		+	+	+	+			+		
Aizoacea? sp						+	+													
Portulacaceae																				
Portulaca oleraceae		+	+				+	+				+	+				+			
sp		+		+		+	+					+				+				
sp								+												
Caryophyllaceae																				
Drymaria cordata			+				+	+							—					
Menispermaceae																				
Cissampelos galapagensis														+						
Pareira		+	+				+	+		+				+	+		+			
Anonaceae																				
Anona cherimolia							+													
glabra			+																	

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
CRUCIFERAE																				
Brassica arvensis							—													
campestris							+	+												
Coronopus didymus			+												—					
Lepidium virginicum								+												
Raphanus sativus							—	+												
CRASSULACEAE																				
Crassuvia floripendia								+												
LEGUMINOSAE																				
Acacia farnesiana			—											+						
macracantha			+				+	+		+			+	+	+					
tortuosa							+	+						+	+					
sp			+																	
sp							—													
sp															+					
Astragalus Edmonstonei							+													
Caesalpinia Bonducella			+																	

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
pulcherrima							—	—												
Canavalia obtusifolia					+															
Cassia hirsuta							+													
occidentalis			+				+	+												
picta			+				+	+												
sericea								—						—				+		
Crotalaria glabrescens			+					—												
pumila		+	+				+	+						+	+		+	+		
setifera		+	+											+						
Dalea domingensis								+												
parvifolia			+				+	+						+	+					
tenuicaulis			+					+												
Desmanthus depressus		+					+	+		+		+	+			+				
Desmodium galapagense															—					
incanum								+												
molle		+	+		+		+					+	+	+		+		+		
spirale			+		+		+					+	+		+			+		

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
uncinatum			+					+						+						
Erythrina velutina			+?											+	+					+
Galactea Jussiaeana var. glabrescens								+					+							
var. volubilis		+	+				+	+		+		+		+	+	+	+	+		
tenuiflora														+	+					
n. sp							—													
Geoffroea striata							+						+?							
Inga edulis							+													
sp								+												
Mimosa asperata							—													
Mucuna rostrata														+						
Neptunia plena							+	+				+		+		+		+		
Parkinsonia aculeata			+				+	+		+			+	+				+		
Phaseolus adenanthus													+							
mollis															—	+				
semierectus							+	+												
vulgaris			+																	

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
sp.								+												
Piscidia Erythrina								+						+	—					
Prosopis dulcis		+	+	+			+	+		+		+	+	+	+	+		+		
Rhynchosia minima		+	+	+	+		+	+						+			+			
reticulata								—												
sp.			+																	
sp.					+															
Stylosanthes scabra		+	+		+		+			+				+		+				
Tephrosia cinerea		+	+	+	+		+	+		+			+	+			—	+		
Vigna owahuensis															—					
Zornia diphylla			+																	
OXALIDACEAE																				
Oxalis carnosa		+					+			+										
Cornelli			+	+			+	+		+		+	+	+	+					
corniculata			+				+	+												
LINACEAE																				
Linum oligophyllum			+																	

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS

Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
ZYGOPHYLLACEAE																				
Kallstroemia adscendens							—	+		—		+	+							
Tribulus cistoides		+?	+			+	+						+	+	—		+	+		
var. anacanthus			+																	
sericeus							+	+												
sp.									+											
RUTACEAE																				
Zanthoxylum Fagara		+	+				+	+		+			+	+	+		—			
SIMARUBACEAE																				
Castela galapageia			+					+					+							
forma albemarlensis			+											+		+	+			
forma bindloensis					+															
forma carolensis		+					+	+										+		
forma duncanensis				+						+						+				
forma jacobensis															+					
BURSERACEAE																				
Bursera graveolens		+	+	+	+		+	+	+?			+	+	+	+	+	+		+	

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
malacophylla																		+		
POLYGALACEAE																				
Polygala Anderssonii														+						
galapageia		+	+		+		+	+						+	—	+				
var. insularis			+				+	+						+		+				
EUPHORBIACEAE																				
Acalypha Adamsii								+												
albemarlensis			+																	
Baurii			+				+													
chathamensis								+												
cordifolia							—	—												
diffusa			+					—												
flaccida															—					
parvula			+				+													
reniformis							—													
sericea		+	—		+															
spicata			+				+	+		+		+	+	+		+				

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
strobilifera			+					+												
velutina							+	+												
var. minor							+													
sp				+																
sp				+																
sp				+																
sp														+						
sp										+										
sp			+																	
sp														+						
Croton Scouleri			+	+	+	+	+	+					+	+	+	+	+		+	
var. albescens			+		+		+	+						+	+					
forma microphyllus			+																	
var. brevifolius		+	+		+		+		+	+		+	+	+	+			+		+
var. glaberiusculus		+																		
var. grandifolius		+	+				+	+							+				+	
var. Macraei			+				+							+	+					

Table Showing the Distribution of Pteridophytes and Spermatophytes upon the Galapagos Islands
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Euphorbia amplexicaulis		+			+	+		—			+			+				+	+	+
apiculata								+												
articulata		+	+		+		+	+						+	+			+		
var. bindloensis		+			+															
diffusa			+					+		+				+		+	+			
equisetiformis			+																	
flabellaris		+	+	+			—	+				+		+	+			+	+	
galapageia							+													
nesiotica																		+		
nummularia								+												
var. glabra							+													
pilulifera							+	+							+					
punctulata			—							+			+							
recurva								+												
Stevensii		+	+																	
thymifolia										+										
viminea			+		+									+						

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS

Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
forma barringtonensis				+	+															
forma carolensis							+													
forma castellana		+										+							+	
forma chathamensis								+												
forma jacobensis															+					
forma jervensis																+				
var. abingdonensis		+																		
sp.								+												
sp.							—													
sp.							+													
Hippomane Mancinella			+				+	+						+	+					
Jatropa curcas							+													
Manihot utilissima			+					—						+						
Phyllanthus carolinensis		+	+				+	+		+					+		+			
Ricinus communis							—	+												
CALLITRICHACEAE																				
Callitriche sp.							+													

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
CELASTRACEAE																				
Maytenus obovata			+	+			+	+		+		+	+	+	+	+	+	+		
SAPINDACEAE																				
Cardiospermum Corindum			+				—	+		+				+	+					+
galapageium			+											+	+					
Dodonaea viscosa			+												+					
var. spathulata			+																	
Sapindus Saponaria			+																	
RHAMNACEAE																				
Discaria pauciflora			+	+			+	+		+			+	+	+	+		+		
VITACEAE																				
Cissus sicyoides			+		—		+										+			
Vitis vinifera							+													
TILIACEAE																				
Corchorus pilobolus			+				+?					+								
Triumfetta semitriloba			+																	

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
MALVACEAE																				
Abutilon depauperatum		+	+	+	+		+	+		+		+	+	+					+	
crispum							+													
sp.														+						
sp.														+						
Anoda hastata							+													
Bastardia viscosa		+	+					+		+			+	+	+					
Gossypium barbadense		+	+	+			+	+		+		+	+	+	—	+		+		
Klotzschianum			—		+		—	—						+						
Hibiscus diversifolia								+												
Manihot			+																	
Tiliaceus			+				—							+						
Malachra capitata															—					
Malvastrum americanum							+	+												
spicatum								+						+						
Sida acuta var. carpinifolia							+													
paniculata			+				+	+												

Table Showing the Distribution of Pteridophytes and Spermatophytes upon the Galapagos Islands
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
rhombifolia							+	+												
spinosa		+	+				+	+		+		+		+	—		+			
supina		+	+				+			+										
veronicaefolia var. humilis			+																	
Malvacea?		+																		
Sterculiaceae																				
Waltheria reticulata		+	+				+			+					+	+				
forma Anderssonii				+				+						+			+		+	
forma intermedia			+		+		+	+				+		+	+		+			
Hypericaceae																				
Hypericum thesiifolium			+					+												
Turneraceae																				
Turnera ulmifolia							+													
Passifloraceae																				
Passiflora foetida			+				+	+						+						
lineariloba			+				—					+	+	+	+		+			
subrosa		+	+					+		+										

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
CARICACEAE																				
Carica Papaya			+				+	+												
LOASACEAE																				
Mentzelia aspera			+				+	+		+		+	+	+	+				+	
Sclerothrix fasciculata			+												+		+			
CACTACEAE																				
Cereus galapagensis							+	+						—?						
nesioticus		+	+					—							+		+		+	
sclerocarpus			+											+	+					
sp.					—															
Opuntia galapageia		+					+			+		+	+		+					
Helleri					—?				—?										+	+
insularis			+																	
myriacantha			+	+				—						+	+	+				
sp.																	—			
sp.			+											+				+		

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
LYTHRACEAE																				
Cuphea patula								+												
Punica Granatum								+												
sp							+													
RHIZOPHORACEAE																				
Rhizophora Mangle			+				+	+		+			+	+	+		+	+?	+	
MYRTACEAE																				
Eugenia Jambos								+												
Psidium galapageium		+	+					+						+	+					
COMBRETACEAE																				
Conocarpus erectus			+					+						+	+					
Laguncularia racemosa		+	+				+	+		+				+	+	+	+			
MELESTOMACEAE																				
Miconia Robinsoniana								+												
ONAGRACEAE																				
Jussiaea repens								+												

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
HALORRHAGIDACEAE																				
Myriophyllum sp.							+													
UMBELLIFERAE																				
Apium laciniatum							+													
leptophyllum		+	+					+							—					
Centella asiatica			+					+		+										
Hydrocotyle galapagensis								+												
Petroselinum sativum							—													
PLUMBAGINACEAE																				
Plumbago scandens		+	+				+	+		+		+	+	+	+					
APOCYNACEAE																				
Vallesia glabra			+				+	+					+	+	+					
pubescens			+				+	+					+	+						
ASCLEPIADACEAE																				
Asclepias angustissima		+	+				+			+				+	+	+	+			
Curassavica							+													

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
CONVOLVULACEAE																				
Argyreia tiliaefolia			+											+						
Calystegia Soldanella							—													
Cuscuta acuta			+		+		+	+									+			
gymnocarpa			+												+					
Evolvulus hirsutus		+	+				+	+		+				+	—			+		
simplex			+				+	+						+	+					
Ipomoea Bona-nox			+												+					
Habeliana		+			+		+			+		+	+		+				+	
Kinbergi		+				+		—						+		+			+	+
linearifolia															—					
Nil							+	+												
pentaphylla		+	+				—	—		+		+	+	+	—	+		+	+	
Pes-caprae			+					—						+						
triloba			+				+	+		+			+	+	+			+		
tubiflora															—					

Table Showing the Distribution of Pteridophytes and Spermatophytes upon the Galapagos Islands
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Hydrophyllaceae																				
Hydrolea dichotoma			+																	
Boraginaceae																				
Coldenia Darwini		+	+		+		+	+						+	+	+				
fusca			+	+		+	+	+					+	+				+		
Cordia Anderssoni							+	+							+					
galapagensis		+	+	+				+		+			+	+			+			
Hookeriana			+				+								+		+			
leucophlyctis			—												+					
lutea		+	+	+	+		+	+		+		+	+	+	+	+		+	+	
revoluta							—													
var. nigricans			—																	
Scouleri			+					+							—					
n. sp.?							+													
Heliotropium Anderssonii														+						
curassavicum		+	+		+	+		+				+	+	+	+			+		
indicum							+	+												

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
parviflorum		+	+	+		+	+	+				+	+	—	+		+		+	+
Tournefortia hirsutissima								—												
psilostachya		+	+				+	+		+			+	+	+					
pubescens			+				+	+		+				+	+					
rufo-sericea		+	+				+	+		+				+	+					
strigosa			+				—	—						+	+					
syringaefolia								—							—					
VERBENACEAE																				
Avicennia officinalis			+				+	+		+				+	+	+	+	+		
Clerodendron molle			+				+	+						+	+					
sp							—													
sp							—													
Duranta repens			+							+										
Lantana peduncularis		+	+	+	+		+	+		+		+	+	+	+	+	+		+	
Lippia canescens							+	+		+			+							
rosmarinifolia		+	+												+		+			
salicifolia							—													

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Priva lappulacea							+													
Stachytarpheta dichotoma							+													
Verbena carolina															+					
grisea										+										
litoralis			+				+	+												
officinalis															—					
LABIATAE																				
Hyptis capitata			+				—													
spicata?			+																	
subverticillata			+											+	+		+			
Salvia occidentalis			+				+	+							+					
prostrata							+								—					
tiliaefolia							+													
Teucrium inflatum			+				+	+												
SOLANACEAE																				
Acnistus ellipticus			+				+	+		+					+					
Brachistus pubescens			+												+					

Table Showing the Distribution of Pteridophytes and Spermatophytes upon the Galapagos Islands
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Cacabus Hookeri														—						
Miersii		+	+	+			—	+	+			+	+				+			
Capsicum annuum							+	+												
Datura Tatula			+				+													
sp.			+																	
Lycium geniculatum										+			+					+		
sp.		+	+				+			+		+	+							
Lycopersicum esculentum var. minor		+	+					+			+		+	+	+		+			
peruvianum var. parviflorum								—												
pimpinellifolium			+				—	—							—					
sp.								+												
Nicotiana glutinosa							—													
Tabacum			+				—													
sp.							—													
Physalis angulata			+				+	+												
ixocarpa			+				+													

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
pubescens			+		+		+	+		+			+	+	+		+			
sp.		+																		
Solanum Edmonstonei							—													
nigrum		+	+				+	+		+					+					
Quitoense															+					
verbascifolium			+				—								—		+			
sp.							—													
sp.							—													
SCROPHULARIACEAE																				
Bacopa monniera		+						+												
Capraria biflora var. pilosa							+	+												
peruviana							—													
Galvezia fruticosa																+				
Scoparia dulcis			+				+	+							+					
BIGNONIACEAE																				
Tecoma sp.?								—												

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
ACANTHACEAE																				
Dicliptera peruviana															+					
Justicia galapagana		+	+											+	+					
Ruellia paniculata								+												
Tetramerium hispidum			+				+	+						+	+					
PLANTAGINACEAE																				
Plantago major			+				+	+												
tomentosa var? pumila															—					
RUBIACEAE																				
Borreria basalis								—												
Baurii								+												
dispersa			+				+	+						+	—					
divaricata							+													
ericaefolia		+	+				+	+						+	+	+	+			
falcifolia			—																	
galapageia										+										

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
linearifolia															—					
ovalis							+													
forma abingdonensis		+																		
pacifica														+						
parvifolia			—																	
perpusilla															—					
rotundifolia														+						
suberecta			+	+																
sp.								+												
Chiococca alba		+	+		+		+	+		+				+	+		+			
Coffea arabica								+												
Diodia Radula			+				+	+							+					
Psychotria angustata							—													
rufipes		+	+				+	+						+	+					
Relbunium hypocarpium							+													
Spermacoce tenuior								+												

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
CUCURBITACEAE																				
Citrullus vulgaris			+				—													
Cucurbita Pepo			+				—													
Elaterium cordatum		+	+					+							—					
Momordica Charantia			+																	
Sicyos villosus							—													
CAMPANULACEAE																				
Lobelia Cliffortiana			+				+								—					
GOODENIACEAE																				
Scaevola Plumieri			+				+	+						+						
COMPOSITAE																				
Acanthospermum leucocarpoides							+					+	+							
microcarpum							+													
Ageratum conyzoides			+				+	+												
Ambrosia artemisiaefolia							+													
Aplopappus lanatus	—																			

Table Showing the Distribution of Pteridophytes and Spermatophytes upon the Galapagos Islands
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Baccharis pilularis							—													
Pingraea var. angustissima			+											+						
Steetzii							+	+												
sp.															+					
Bidens chilensis			+																	
pilosa			+				+	+												
refracta			+				+	+					+		+		+			
Blainvillea dichotoma		+	+	+			+	+		+			+	+	+		+	+		
tenuicaulis			—				—													
Brickellia diffusa			+																	
Chrysanthellum erectum								+						+			+			
pusillum			—				+	+												
Eclipta erecta							+	+					+							
Elvira inelegans							—													
repens			+												+					
Encelia hispida				+			—	+												

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Erigeron lancifolius			+														+			
var. glabriusculus			+																	
linifolius			+				+	+												
tenuifolius		+	+				+			+				+	+					
var. tomentosus															+					
Eupatorium filicaule			+											+						
sp.							—													
sp.			+																	
Flaveria bidentis							—													
Gnaphalium luteo-album			+																	
Hemizonia squalida	—																			
Jaegeria gracilis							—													
hirta			+					+												
prorepens															—					
Lecocarpus pinnatifidus							+	—												
Lipochaeta laricifolia		+	+				+	+						+	+		+			

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Pectis Anderssonii														+						
Hookeri			+	+			+						+		+	+	+	+		
linifolia								+						—				+		
subsquarrosa								—												
tenuifolia			+				+	+						+			+	+		
Porophyllum ruderale		+	+				+	+		+			+	+	+	+				
Scalesia affinis							+							+						
aspera														+						
atractyloides															+					
Baurii										+										
var. glabrata										+										
cordata			+																	
Darwinii															+					
decurrens			—				+													
divisa								+												
gummifera			+											+						

TABLE SHOWING THE DISTRIBUTION OF PTERIDOPHYTES AND SPERMATOPHYTES UPON THE GALAPAGOS ISLANDS
Continued

	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Helleri				+																
Hopkinsii		+																		
incisa								—												
microcephala			+														+			
narbonensis																	+			
ovata							+													
pedunculata							+	+						+	+					
retroflexa														+						
Snodgrassii																				+
villosa							+													
var. championensis[1]																				
sp.									+											
Sonchus oleraceus			+				+	+									+			
Spilanthes Acmella							—										+			
diffusa							—								—					
Tagetes erecta								—												

[1] Champion Island.

Botanical Regions

Those who have written on the phytogeography of the Galapagos Islands in the past, have often mentioned the great difference in the character of the vegetation on the higher and lower parts of many of the islands, a difference that is very marked and can often be readily seen at a mere glance from the shore or a few miles out at sea by the contrast in the color of the vegetation in the several regions. In fact it is often easier to make out the limits of the regions from a distance than close at hand, for they frequently grade imperceptibly into each other, and the variations in color can not be so readily distinguished when one is going through the islands. On certain islands some of the regions are often ill defined or entirely lacking, a fact that is probably due mostly to climatic but sometimes to edaphic factors.

Above the strand vegetation, which forms a narrow belt along the shores in many places, four botanical regions can be recognized, the Dry, Transition, Moist, and Grassy.

Dry Region

The lower slopes of the higher islands and the whole slopes of the lower ones are covered with a vegetation which is very xerophytic in character. The most striking plants in this region are the arborescent cacti, which often occur in large numbers and sometimes attain a height of forty or more feet. Except the cacti, the trees in this region are for the most part rather low, deciduous in character, and very much scattered. Between the trees, where they occur, the ground is usually covered with low bushes, which either shed or greatly reduce their leaves during the greater part of the year, and those which retain their leaves usually have them covered with a heavy coating of plant hairs. The landscape accordingly presents a dreary gray aspect, which is greatly accentuated by the color of the trunks of both the *Croton* bushes and *Bursera* trees.

During the spring months this region takes on a green appearance, but is lighter in color than the moist region above. During this season most of the annual plants spring up rapidly, and mature before the dry season sets in again.

While it is difficult to give a list of plants which are strictly characteristic of this region, the following includes those species which are most common. Those which are followed by an asterisk in this and the following lists are, so far as is known, characteristic of the region to which they are referred.

*Acacia macracantha**
*Aristida divulsa**
    *subspicata**
*Borreria ericaefolia**
Bursera graveolens
Castela galapageia
*Cenchrus platyacanthus**
*Cereus galapagensis**
    *nesioticus**
    *sclerocarpus**
Clerodendron molle
*Coldenia Darwini**
    *fusca**
Cordia galapagensis
    Hookeriana
    lutea
*Croton Scouleri**
    var. *brevifolius*
    var. *Macraei**
Desmanthus depressus
*Discaria pauciflora**
*Erythrina velutina**
*Euphorbia amplexicaulis**
    *articulata**
    viminea
Gossypium barbadense
Lantana peduncularis
Maytenus obovata
Mentzelia aspera
*Opuntia galapageia**
    *myriacantha**
*Parkinsonia aculeata**
Piscidia erythrina
Prosopis dulcis
*Scalesia atractyloides**
Telanthera echinocephala
    nudicaulis
Waltheria reticulata

Transition Region

As the name would indicate, the vegetation in this region is transitional in character, being made up of a mixture of xerophytic plants from the dry region below and the more hardy of the mesophytic plants from the moist region above. There is usually a great thickening of the vegetation in this region, and a considerable number of the evergreen species appear, so that the landscape has a mottled appearance when seen from a distance. In fact the deciduous character of the vegetation in the dry regions, the evergreen character in the moist regions, and the mixture of the two in the transition regions, are the principal causes of the well marked appearance of zonation on many of the islands.

The trees in this region are taller, as a rule, and closer together than they are in the dry region, while underneath the trees the bushes and undergrowth are larger and thicker on the ground. A few species of epiphytic plants are found, among which fruticose lichens are most abundant, often occuring in such large quantities as to give a distinct color to the vegetation. A few of the more xerophytic species of ferns, as well as a number of herbaceous perennial plants, occur. The annual herbaceous forms are rather in the minority as compared with the perennials. The following list includes the plants which are most common in this region.

Adiantum concinnum
Bursera graveolens
Castela galapageia
Ceropteris tartarea
Chiococca alba
Cissampelos Pareira
Clerodendron molle
Cordia galapagensis
  Hookeriana
  lutea
Croton Scouleri var. *brevifolius*
Doryopteris pedata
Erigeron tenuifolius
Euphorbia viminea
Gossypium barbadense
Ionopsis utricularioides
Lantana peduncularis
Lipochaeta laricifolia
Maytenus obovata
Pisonia floribunda
Polypodium lepidopteris
  pectinatum
  squamatum
Psidium galapageium
Psychotria rufipes
Scalesia pedunculata
Telanthera echinocephala
Tillandsia insularis
Tournefortia rufo-sericea
Trachypteris pinnata
Waltheria reticulata
Zanthoxylum Fagara

Moist Region

The vegetation of the moist region is of a decidedly mesophytic character, all the xerophytic species which persist in the transition region having disappeared, except in a few rare instances. In these cases there may be an occasional straggler from below, or conditions of soil or exposure are such that mesophytic plants will not grow. In general this region is characterized by the presence of large forests, made up for the most part of trees of *Psidium galapageium, Pisonia floribunda,* and *Scalesia pedunculata,* which it seems well to call the "*Scalesia* forests." The undergrowth is often dense in these forests, and is made up mostly of larger species than are found in the two lower regions. Epiphytic ferns and orchids, as well as several species of leafy hepatics, grow abundantly. Lianes also abound, although belonging largely to a single species. The mesophytic species of ferns are very common, and often form brakes of considerable size. In general, the vegetation of this region presents an appearance very similar to that which is usually found in the moist tropics, the rain-forest type being closely approached in places. While forests predominate, there are a few localities in which they are absent or only represented by an occasional tree. In such places the vegetation is made up mostly of bushes and ferns, over which there are tangled masses of lianes, mostly of the herbaceous type. The following list includes the species of plants which are most noticeable in the moist region.

Acrostichum aureum
Adiantum concinnum
    Henslovianum
    macrophyllum
Argyreia tiliaefolia
Asplenium cristatum
    formosum
    praemorsum
    Serra
    sulcatum
Blechnum occidentale
Ceropteris tartarea
Cheilanthes microphylla
Chiococca alba
Cissampelos Pareira
Croton Scouleri var. *grandifolius*
Doryopteris pedata
*Dryopteris parasitica**
Epidendrum spicatum
Erigeron linifolius
Hemitelia multiflora
Ionopsis utricularioides
Nephrolepis biserrata
    *pectinata**
Pisonia floribunda
Polypodium aureum
    lanceolatum
    lepidopteris
    pectinatum
    *Phyllitides**
    squamatum
Psidium galapageium
Psychotria rufipes
Pteris aquilina var. *esculenta**
    *incisa**
Scalesia pedunculata
    cordata
Tillandsia insularis
Tournefortia rufo-sericea
Trachypteris pinnata
*Urera alceaefolia**
Zanthoxylum Fagara

Grassy Region

This region lies above the moist region, and is characterized by considerable areas covered with perennial grasses, the most common of which is *Paspalum conjugatum*. Trees are almost entirely absent except in protected places, the probable cause of their absence being the greater velocity of the wind at the higher elevations, combined with a somewhat less amount of precipitation. A number of bushy and shrubby plants are found in this region, the most common of which are *Tournefortia rufo-sericea* and *Zanthoxylum Fagara*. There are also a considerable number of species of ferns, but it is seldom that brakes of any size are formed by them. There are but two islands in the group on which this region is well developed, Albemarle and Chatham. On both of these the belt in question is used for grazing purposes by the inhabitants. The upper part of the highest crater on Charles Island is also covered by this region, but the area here is so small as to be negligible. The following table shows the elevations in feet at which the different regions end at the various places on the islands visited by our party. The islands not mentioned are either too low to possess more than the dry region, or their regions are so ill defined as to render the exact limits impossible of determination. Elevations which are followed by an asterisk are estimated, the estimates often having been made from a few miles out to sea by comparing the elevation of the place in question with that of some other place the elevation of which was known.

ZONAL ELEVATIONS

Locality	Dry Region	Transition Region	Moist Region	Grassy Region
Abingdon Island, north side......		1500*		
south side......	450	1000	1950	
Albemarle Island, Banks Bay.....		1500*		
Cowley Bay....	1000	3000*		
Iguana Cove...	0	0		
Villamil........	150	350	1500	3150
Charles Island, Black Beach Road	450	1000		1780
Chatham Island, Wreck Bay......	650	800		2100
Duncan Island..................	900	1300		
Indefatigable Island, Academy Bay.	350	500	1500*	
north side....	1500*	2000*		
northwest side	450	700		
southeast side.	400	800*		
James Island, north side..........	1500*	2000*		
south side..........	900	1600	2850	
James Bay.........	1300	2000*	2850	

From this table it appears that there is often a great difference in the elevations at which a region begins and ends on the same sides of different islands as well as on different sides of the same islands. In the first instance it seems likely that the size of the island and the degree of slope are involved. On large islands, like Albemarle and Indefatigable, the southern sides slope very gradually, and the transition and moist regions extend down much lower than on Abingdon and James, which are smaller and have steeper sides. A notable exception occurs, however, at Iguana Cove on the southwest side of Albemarle Island, where the conditions are very peculiar indeed. This is the only place on the islands, outside of a few isolated spots near brackish springs, where there is sufficient moisture at sea level to support a mesophytic vegetation. But the extent of the moist region at this place is very limited, for at Christopher Point, only five miles north, and at Essex Point, four miles south, the vegetation at sea level is again very xerophytic. The great difference in elevation of the different regions on the leeward and windward sides of the islands, is due to the fact that the fog in passing over the tops of the mountains rolls down but a short distance on the leeward sides, and leaves the islands at a much higher level than it struck them on the windward sides. The lower limits of the moist regions are usually as well marked, by the difference in the color of the vegetation, on the leeward as on the windward slopes of the islands.

General Features of the Flora

PTERIDOPHYTA

Filices are the family that contains the largest number of species, but at the same time the smallest number of endemic forms in proportion to the number of species represented, of any family of vascular plants found on the islands. Ferns occur mostly in the transition and moist regions, where they sometimes grow in great profusion. They are not confined to these regions, however, as there are instances of their occurrence under decidedly xerophytic conditions in the dry region. The species which occur thus are *Ceropteris tartarea, Cheilanthes microphylla, Notholaena sulphurea, Polypodium squamatum,* and *Trachypteris pinnata.* Hydrophytic ferns are few in number, and are confined to a few rather restricted areas, in the moist regions on several islands, where the amount of moisture present is greater than is ordinarily the case. Those species which are decidedly hydrophytic, or show tendencies in this direction, are some of the species of *Adiantum, Asplenium cristatum,* and the species of *Hymenophyllum* and *Trichomanes.* Epiphytic species include *Asplenium praemorsum* and *sulcatum, Nephrolepis pectinata, Polypodium angustifolium, aureum, lanceolatum, lepidopteris, polypodioides,* and *thyssanolepis.* Over one half of the species of *Polypodium* found on the islands are epiphytic in habit, all but one, in fact, being habitually so. Fern brakes of considerable size are formed by *Nephrolepis biserrata,* and *Pteris aquilina* var. *esculenta,* while *Polypodium squamatum* often forms low brakes one to two feet high in moist shady places in the transition region. *Hemitelia multiflora* is the only tree fern, and is confined to the upper parts of three of the higher islands. Ferns have now been found on all of the important islands of the group except Barrington, Culpepper, Seymour, and Tower, the conditions on these islands being too dry to support even the more xerophytic species. The water ferns are of relatively little importance in the archipelago, being represented by a species each of *Azolla* and *Salvinia.*

The *Lycopodiaceae* are represented by five species of *Lycopodium,* all of which occur in the moist and grassy regions of the islands. Two of the species are epiphytic and the remaining three terrestrial. The *Equisetaceae* are represented by a single species, *Equisetum bogotense,* which occurs in a very small area on the top of one of the mountains on Albemarle Island.

SPERMATOPHYTA

Monocotyledoneae

The *Gramineae* are the fourth largest family, in number of species, found on the islands. By far the largest number of the species are confined to the dry and transition regions, the moist region being too shady, in most places, to support an abundant growth of grass. The only grass of any importance which occurs above the transition region is *Paspalum conjugatum,* which often covers extensive areas in the grassy region and forms an important forage grass for the cattle and other domesticated animals on the islands. Grasses which occur under halophytic conditions are a species of *Ammophila,* probably *A. arenaria,* and *Sporobolus virginicus,* the last of which covers some of the sand beaches with heavy tangled mats. Great numbers of land birds were often found feeding in the grassy areas in the dry and transition regions, a fact which suggests the possible origin of this rather important element of the flora.

The second largest family of the Monocotyledons is the *Cyperaceae,* which are the seventh largest family, in number of species, found on the islands. The best represented genus is *Cyperus,* of which there are more than sixteen species and varieties, one or more of which occur on all of the islands except Brattle. They form a noticeable but not important element of the flora in the dry and transition regions, but with the exception of *C. grandifolius* are not conspicuous in either the moist or grassy regions. In the Voyage of the Beagle, Darwin speaks of beds of *Cyperus* on the upper parts of James Island, in which he found a species of water rail. We were able to secure several specimens of this rather rare bird, but without exception they were found in beds of *Paspalum conjugatum,* which grows abundantly in open places throughout the moist region on this island. Of the remaining genera of sedges *Dichronema* is represented by one species, *Eleocharis* by three, *Fimbristylis* by two, and *Hemicarpha, Kyllinga,* and *Scleria* by one each, none of which are widely distributed over the islands or form an important element of the flora in the regions where they occur.

Outside of the grasses and sedges the remaining monocotyledonous families are of little importance. The *Orchidaceae* are represented by four genera of one species each, all of which are found above the dry region. The *Bromeliaceae* are represented by *Tillandsia,* of which there is a single endemic species that in places forms a noticeable element of the flora. Other monocotyledonous plants are for the most part small and rather rare of occurrence.

Dicotyledoneae

The *Piperaceae* and *Urticaceae* are both small families, the first being represented by eight species of *Peperomia,* all but one of which are endemic. These include both epiphytic and terrestrial forms and are all confined to the transition and moist regions of the islands. The *Urticaceae* are represented by six species, one of which is endemic. They are all herbaceous forms except *Urera alceaefolia,* which forms large sized bushes and is rather an important element of the flora in the moist regions of both Albemarle and Indefatigable Islands.

The *Amarantaceae* are the sixth largest family of vascular plants found on the islands, being represented by thirty-three species, varieties, and forms. The two most important genera are *Amaranthus* and *Telanthera.* The species of the first of these are herbaceous in character and furnish some of the most noticeable of the spring weeds in the dry and transition regions. The species of *Telanthera* are woody in character and the genus is represented in all the regions by species which are shrubby or bushy in form. Of the thirteen species and varieties of this genus all are endemic but two.

The *Nyctaginaceae* are represented by four genera, three of which form rather important elements of the flora. *Cryptocarpus pyriformis* is usually found in the neighborhood of the coast, where it often forms rather conspicuous thickets of light green bushes which stand out in strong contrast with the gray colored vegetation farther inland. *Boerhaavia* is represented by four species in the dry and transition regions, and *Pisonia* by one that forms one of the important forest trees in the transition and moist regions.

The family of *Aizoaceae* is noteworthy in that it contains two of the important elements of the halophytic flora, namely *Sesuvium Edmonstonei* and *S. Portulacastrum.* The first of these species is endemic, while the second has a wide distribution on tropical shores.

The *Menispermaceae* contain but two species: *Cissampelos galapagensis* and *C. Pareira.* The latter is one of the most noticeable plants in certain parts of the transition and moist regions, where it often covers the branches of the trees in great profusion, while the large number of absorbing roots which are put down from above may form tangled masses and render traveling very difficult. It is the only plant on the islands that approaches the woody liane type.

The *Leguminosae* are the fifth largest family in number of species on the islands, being represented by forty-five species, six of which are endemic. This family contains some of the largest forest trees, as well as many herbaceous and shrubby forms. All of these are most abundant in the dry and transition regions, and many of the species are armed with spines. Several of the smaller Lianes being to this family. In the moist and grassy regions the woody species are almost entirely absent, but there remain a considerable number of herbaceous forms, among which *Desmodium* is most conspicuous.

The *Rutaceae* are represented by a single species, *Zanthoxylum Fagara,* which occurs in all of the regions on many of the islands. This species varies greatly in size, often occurring as small bushes in the dry region, while in the moist zone it assumes the height of a tree, the increase in size being gradual with the increase in elevation. In many places in the dry and transition regions this plant forms dense low thickets of bushes which, owing to the strongly recurved spines that cover the branches, are very hard to penetrate. It is one of the favorite host plants for *Phoradendron Henslovii* on the parts of the islands where this parasite occurs.

The *Simarubaceae* have but one representative, *Castela galapageia,* which occurs as bushes in both the dry and transition regions. This species varies greatly in the size of the leaves and in the arming of the stem, so that several forms have been based on these characters.

Bursera graveolens and *B. malacophylla* are the only representatives of the *Burseraceae* found on the islands. The first of these is one of the most abundant forest trees in the dry region, and is found on all of the more important islands of the group but Duncan. It never occurs above the transition region except as an occasional straggler. The second species is endemic, and so far as known occurs only on the Seymour Islands.

In number of species, varieties, and forms, the *Euphorbiaceae* are the third largest family of vascular plants found on the islands, and are of prime importance in that they furnish many of the characteristic species of all of the regions. The various forms of *Croton Scouleri* constitute conspicuous elements in all of the regions where this species occurs, and in the dry region dense thickets of *Croton* bushes often cover considerable areas almost to the exclusion of all other perennial vege-

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tation. The forms of this species which occur in the dry region are usually rather low and covered with small leaves of a decidedly gray color, due to the heavy covering of trichomes. Those forms which occur higher up in the transition and moist region are larger, sometimes attaining the size of small trees. On these the leaves are larger and with a much lighter covering of plant hairs. Species of *Euphorbia* occur to some extent in all of the regions, but are most abundant in the dry and lower transition, the species which occur here being for the most part bushy in character with small and inconspicuous leaves. The species which occur above the transition region are mostly procumbent herbaceous forms. Of the remaining genera *Acalypha* and *Hippomane* are the most important. *Acalypha* is represented by fourteen species and varieties, all of which are endemic. They are found for the most part in the transition and moist regions. *Hippomane Mancinella* occurs in various habitats, halophytic, xerophytic, and mesophytic, with apparently no decided change in form in any of them.

The *Celastraceae* have but a single representative, *Maytenus obovata,* bushes of which form a very important element of the flora of the dry regions, especially in the neighborhood of the coast. It occurs more or less abundantly throughout the dry and transition regions, in the first of which it is about the only green bush of any size during a great part of the year.

The *Sapindaceae* are one of the smaller families in number of species, but are important from the fact that *Cardiospermum* furnishes a rather important herbaceous liane and *Sapindus Saponari* the largest forest tree found on the islands. The *Rhamnaceae* are represented by *Discaria pauciflora,* bushes of which occur abundantly in the lower parts of the dry regions.

Outside of a few herbaceous forms, *Gossypium barbadense is* the most important member of the *Malvaceae.* Bushes of this species occur in greater or less abundance in the dry and transition regions.

The *Cactaceae* are represented by several species of *Cereus* and *Opuntia,* most of which form rather striking elements of the flora. Both genera have both bushy and arborescent species, and are found for the most part in the dry and transition regions.

The *Rhizophoraceae* and *Combretaceae* include some of the most important elements of the littoral vegetation. *Rhizophora Mangle* of the first of these families forms dense low forests below high tide mark, while *Conocarpus erectus* and *Laguncularia racemosa* of the second occur farther back as bushes and small trees.

The various species of *Ipomoea* are the most significant members of the *Convolvulaceae* in that some of the most important of the herbaceous lianes of the islands are members of the genus. This genus also furnishes species which occur under all conditions, halophytic, xerophytic, and mesophytic.

The *Boraginaceae* furnish some noteworthy elements of the flora in all of the regions. The various species of *Cordia* constitute important factors of the flora in the dry and transition regions, while the species of *Tournefortia* provide some of the most common bushes in all of the regions, especially in the moist and grassy.

Avicennia, Clerodendron, and *Lantana* are the three genera of the *Verbenaceae* which are of prime importance. *Avicennia officinalis* forms an important element of the littoral vegetation in the form of low forest trees, while the two remaining genera furnish some of the most characteristic bushes of the dry and transition regions.

The *Solanaceae* are the eighth largest family in number of species on the islands, but are of rather secondary importance, as the species for the most part are herbaceous and not especially abundant in any of the regions except during the spring season. At that time they furnish several of the common weeds.

The *Rubiaceae* stand next in importance to the *Solanaceae* in number of species, but most of these are relatively small in size. This is one of the most important families represented in the archipelago in that it contains common species in all of the regions. The various species of *Borreria* are very frequent in the dry regions, some of them inhabiting the most desert situations, even to the exclusion of almost all other species of plants. Bushes of *Chiococca alba* often form an important element of the flora in the transition regions, and *Psychotria rufipes* is of prime importance in the *Scalesia* forests in the moist regions, where it is one of the most abundant bushes.

The *Compositae* stand second in number of species of all of the families of vascular plants occurring on the islands. Many of the common herbaceous annuals of the dry and transition regions, as well as some of the most important bushes, belong to this family. The *Compositae* are however most strikingly represented in the moist regions, where extensive forests of *Scalesia,* made up for the most part of *S. pedunculata,* occur. This genus is also well represented in both the dry and transition regions by shrubby species, which sometimes occur in large numbers over considerable areas. Other noteworthy members of the family are the species of *Erigeron* and *Lipochaeta,* both of which are important where they occur.

The remaining families of vascular plants represented on the islands contain but few species and for the most part are of relatively little importance.

The plants which occur under halophytic or semihalophytic conditions are included in the following genera: *Ammophila, Atriplex, Avicennia, Batis, Cacabus, Conocarpus, Coldenia, Cryptocarpus, Eleocharis, Heliotropium, Hibiscus, Hippomane, Ipomoea, Laguncularia, Lycium, Maytenus, Najas, Rhizophora, Ruppia, Salicornia, Scaevola, Sesuvium,* and *Sporobolus.*

Hydrophytes are comprised in *Azolla, Callitriche, Eleocharis, Lemna, Myriophyllum, Jussiaea,* and *Salvinia,* all of which are of little importance in the composition of the flora, as they mostly occur periodically when there is a supply of fresh water in the ponds and brooks.

Outside of a few species of ferns, the only vascular epiphytes are three species of orchids, two or three species of *Peperomia,* and a *Tillandsia,* the last of which is the most common and largest of the epiphytic plants. All of the above are practically confined to the transition and moist regions, occurring above the last in only a few instances. Phanerogamic parasites are represented by four species of *Phorodendron,* only one of which is sufficiently abundant to be of importance in this respect, and two species of *Cuscuta.* The first of these parasites is found in all of the regions, but is most abundant in the moist, while the second is confined to the dry and transition zones and so far as was observed only appears for a short time during the spring months.

Lianes occur in the following genera: *Argyreia, Asclepias, Boussingaultia, Canavalia, Cardiospermum, Cissampelos, Cissus, Elaterium, Galactea, Ipomoea, Momordica, Mucuna, Passiflora, Phaseolus, Rhynchosia,* and *Sicyos.* Most of these are herbaceous.

Those plants which attain the size of trees are included in the following genera: *Acacia, Acnistus, Avicennia, Bursera, Cereus, Conocarpus, Erythrina, Hibiscus, Hippomane, Opuntia, Piscidia, Pisonia, Psidium, Prosopis, Rhizophora, Sapindus, Scalesia, Solanum,* and *Zanthoxylum.* More than one half of these are confined to the regions below the moist, contrary to the general belief that the lower parts of the islands support only a low and bushy vegetation outside of the arborescent cacti. A few of the above attain sufficient size to be of economic importance for lumber, among which the species of *Erythrina, Psidium,* and *Sapindus* are the most important.

The greater number of species of plants have small and rather inconspicuous flowers, a fact that has been mentioned by other travelers who have visited the islands. There are a few plants, however, that possess rather showy flowers. Such are comprised in the genera *Argyreia, Cacabus, Cereus, Cordia, Datura, Erythrina, Gossypium, Hibiscus, Ipomoea, Kallstroemia, Miconia, Mucuna, Nicotiana, Opuntia, Parkinsonia, Passiflora,* and *Tribulus.* Most of these genera include species of wide distribution. By far the largest number of endemic species have very small flowers, a fact that may be due to the relatively small number of species of insects on the islands.

ECOLOGICAL FACTORS

Water

Great differences in the amount of precipitation are often found within short distances on the Galapagos Islands, sometimes within a change of elevation of two or three hundred feet. The lower parts of the islands adjacent to the shore are as a rule very dry and only receive moisture in any considerable quantities during about three months of the year, while the middle and upper parts are quite moist most of the time. Between the two extremes of moisture there are all sorts of gradations.

During the year our party remained on the islands there were nineteen rainy days at sea level, eleven of which were during the months of January, February, and March, and it was only during these months that the rains were heavy enough to make the ground muddy. During the remaining months of the year the days on which there was rain at sea level were distributed as follows: April one, June one, July three, September two, and December one. None of these rains were heavy, being more in the nature of light showers of short duration. These observations were taken at different places on the islands, but they probably represent approximately the conditions at sea level on any one island during this time. They do not include days on which there were but slight sprinkles of rain or mist.

There were no very heavy rains at sea level during the entire year, but heavy rains must occur here at times, for many of the valleys show considerable erosion. The dry beds of streams are often covered with water-worn boulders, showing that at some time the streams have carried a considerable amount of water. Furthermore the sides of many of the tufa craters are deeply furrowed with gullies, and have much the general appearance of steep hillsides in a country of frequent heavy rains. The people who live on Chatham Island told us that 1906 was an exceptionally dry year. There was no rain on this island from March until July, in consequence of which much of the vegetation was dried up even on the highest parts of the island around 2100 ft. elevation. Similar parched conditions were noticed on the upper part of Charles Island during the months of May and June.

Heavy dews, as well as a considerable amount of mist, often occur at sea level during the spring months. We were anchored at Tagus Cove, on the west side of Albemarle Island, during the greater part of the month of April, and during this time the late nights and early mornings were so misty that any article left exposed over night would usually be quite wet in the morning. The mist would clear away soon after sun-rise, and the remainder of the day would be clear.

The places where precipitation is great enough to support a mesophytic vegetation, are mostly confined to the middle and upper parts of the islands. The moisture here is derived from the fog banks which strike the windward sides of the mountains at various elevations, whereupon the fog is thrown down as fine mist and sometimes rain. These fog banks, however, do not always extend to the tops of the mountains, as these are often clear while the region a few hundred feet below may be entirely enveloped in fog. The soil at the tops of the mountains is sometimes dusty, while a little below the top it may be very moist or even muddy. From February until June inclusive there is much less fog in the upper regions than during the remainder of the year. During these four or five months the tops of the mountains may be entirely clear for several days at a time; but during the remainder of the year they are enveloped in fog, with only occasional clear days. It sometimes happens that the fog will clear away in the early evening to reappear again the following morning.

The direct effect of the fog on the growth of vegetation is well shown on some of the islands, especially so on Duncan above 1000 ft. elevation. The south sides of many of the large lava boulders here are covered with a heavy growth of *Polypodium squamatum,* while the other sides are entirely bare. This condition is due to the fact that the southern exposures are more directly bathed by the fog-laden wind than are the others. Such instances as this are rather common; the windward sides of trees and bushes often have a heavier growth of epiphytic lichens and mosses than the leeward sides.

Streams and springs of water are very scarce on the islands, in fact entirely absent on most of them. There are several springs on Chatham Island above 1000 ft. elevation, one of them large enough to supply a sugar mill as well as all the various needs of a population of some three hundred. There is also on this island a crater lake of considerable size and depth. Furthermore a few small streams occur in the upper regions of this island, but as they are mostly fed by surface water they quickly dry up as soon as the rainy season is over. Charles Island has two springs of fair size, and several seepages of water around the base of a tufa crater at 1000 ft.; but none of these affords sufficient water to form more than a small brook that sinks from sight a short distance away from its source. There are also several small basins in the plateau region of this island around 1000 ft. elevation, but they were all dry at the times this island was visited by our party. With the exception of two small springs at Tagus Cove on Albemarle Island, there are no springs of fresh water on any of the other islands, so far as was observed. On the southeast side of the mountain at Villamil on Albemarle Island, a short distance below the top, there are indeed one or two small lakes, but the inhabitants of the settlement about half way up the side of the mountain, depend entirely on the rain for their water supply. Captain Thomas Levick, an Englishman who has lived on the islands for some thirty-five years, told us that there were small streams in the upper interior region of Indefatigable Island, as well as a crater lake of considerable size, but we were not fortunate enough to get far enough into the interior of this island to find them. Both Duncan and Hood Islands have broad flat basins in their interiors which appear to have been recently filled with water.

There is evidently enough precipitation on all of the higher islands to form springs if there were enough soil to hold it. But as the soil usually forms only a comparatively thin layer over the surface, practically all of the water that falls sinks very shortly into the cracks in the lava and comes out at various places along the shore. Some of these springs are large, and their water, as a rule, is quite brackish, owing to the fact that it consists partly of sea water that has percolated through the lava for a considerable distance inland.

Seasons

The rainy season, and with it the usual spring vegetation, usually come between January and June, and in 1906 were confined to the first three of these months on most of the islands. There is however no absolute certainty when spring will come, and it sometimes misses a year entirely. The time at which the rainy season arrives in a given year varies considerably on different islands. It sometimes commences at different times on adjacent islands, and even two sides of the same island may show a considerable amount of variation in this respect. In 1906 the spring season was at its height at Wreck Bay, on the south side of Chatham Island, in the month of January, while at Sappho Cove, on the north side of this island, it evidently began three weeks to a month later. Somewhat similar conditions were noticed on both Hood and Charles Islands. On the first of these the spring season was just beginning in February, and on the second it appeared to be about as far advanced in March as it had been on Chatham in January. The greatest difference in the time at which this season occurs on two adjacent islands, was noticed on Abingdon and Bindloe Islands, which are separated from each other by a distance of only about thirteen miles. The vegetation on the lower parts of Bindloe was very dry and parched indeed in the month of September, as it is on the lower parts of most the other islands at this time of year; while on Abingdon most of the deciduous vegetation was coming into leaf and the common spring weeds were springing up all over the lower parts of the south side of the island. Whether this condition of affairs occurs yearly or not, is impossible to state, but it is evident that the seasons were very much reversed on these two islands in 1906.

Heat

Considering the fact that these islands lie directly on the equator, the average temperature is quite low, ranging from 70°-80° F. throughout the greater part of the year. It never becomes extremely hot, and at times is really too cool for comfort. We arrived at Hood Island, the most southern member of the group, on Sunday morning, September 24, 1905. After coming to anchor and getting the vessel generally ship-shape, we hoisted an awning over the forward deck and the members of the party collected under it to read or otherwise pass the day. It was not long, however, until we began to move out from under the awning into the sun, as it was really too cool for comfort in the shade, somewhat lightly clad as we were. The sun was not hot, but just comfortably warm, and felt as it does on an early day in spring in temperate latitudes. The rather remarkable thing about the incident was that we were but eighty-two miles south of the equator, with the sun almost directly overhead at this time of year.

It was the intention at first to get daily maximum and minimum temperatures throughout the year, but as the only maximum temperature thermometer we had, was broken soon after we arrived at the islands, this plan had to be abandoned and air and water temperatures were taken instead at intervals of a few days apart. The temperatures were taken at 6 A. M., 6 P. M., and, when it was possible to do so, at 12 M., water temperatures being taken at the surface with a standard Fahrenheit thermometer. The results of these observations are given in the following table.

TABLE OF GALAPAGOS TEMPERATURES, 1905–1906

Station	Date	Morning		Noon		Evening	
		Water	Air	Water	Air	Water	Air
Hood Isl.	Sept. 25	71.5	71.5			73	73
	Sept. 26	71.5	73			73	73
	Sept. 27	73	73			73	73.5
	Sept. 28	73	73.5			73	73
	Sept. 29	73	73.5			73	73
Charles Isl.	Oct. 6	69	69			68	70
	Oct. 7	68	67			68	70
	Oct. 8	67	70	69	73	68	70
	Oct. 9	67	69			68	70
	Oct. 10	70	70			71.5	74
	Oct. 12	69.5	70			70	71
Chatham Isl., Wreck Bay	Oct. 16	67	70	69	73	67.5	70
	Oct. 17	66	71	67.5	72.5	67.5	70
Barrington Isl.	Oct. 20			67.5	69	70.5	71.5
	Oct. 21	70	70	71	72.5	70	72
	Oct. 22			71	74	71	72
	Oct. 23	70	70			70.5	71.5
Indefatigable Isl., Academy Bay	Nov. 10	73	73	75	78	74	74
	Nov. 13	71.5	72	74	77.5	74	75.5
	Nov. 15	72	70			73.5	74
	Nov. 16	72	71	74.5	76.5	74	75
Seymour Isl.	Nov. 22	72.5	72			75.5	76
Indefatigable Isl., north side	Nov. 24	73	73.5			75.5	76
	Nov. 26	75.5	76	76.5	78	76.5	77.5
	Nov. 29	74	71.5	75.5	78	75	77
	Nov. 30	72.5	69.5	75	77	73.5	76.5

TABLE OF GALAPAGOS TEMPERATURES, 1905–1906—*Continued*

Station	Date	Morning		Noon		Evening	
		Water	Air	Water	Air	Water	Air
Duncan Isl.	Dec. 3	69	73	72	74	70	73
	Dec. 4	70	70			70	72.5
	Dec. 6	71.5	71			74	74
	Dec. 13	72	73			73	74
	Dec. 14	72	72	73	75	72	72
James Isl., James Bay	Dec. 22	73	71	73.5	71	73	72
	Dec. 23	72.5	72	73	78.5	73	75
	Dec. 28	70	71	71.5	77	71	75
Indefatigable Isl., Academy Bay	Jan. 15	76	75.5	79	80	77	78.5
Hood Isl.	Feb. 2	75.5	76	78	79	78	78
Chatham Isl., Sappho Cove	Feb. 14	76	77	80	84	79	79
Charles Isl.	Feb. 26	77	76	78	82		
	Feb. 28	76	75			79	81
Albemarle Isl., Villamil	Mar. 6	78	75			79	80
Albemarle Isl., Cape Rose	Mar. 15	72	71			71	79.5
Albemarle Isl., Iguana Cove	Mar. 18	73	74			75	80
	Mar. 20	77.5	75			81	81
Albemarle Isl., Tagus Cove	Mar. 23	79	78	79	88	80	83
	Mar. 24	78	78			71	79
	Mar. 26	78.5	72				
	Mar. 28	74	75	78	88	74.5	78
	Apr. 1	71	72	74	84	74	78
	Apr. 2	70.5	72	74	81	74	79
	Apr. 3	73	74	75	80	73.5	77.5
	Apr. 8	69	70.5	66	75	70	78
	Apr. 9	69	71	65	75	64	77.5
	Apr. 10	63	67	66	76	64	70
	Apr. 11	65	67	67	77	65.5	77
	Apr. 13	65	70	69	79	66	74

Table of Galapagos Temperatures, 1905–1906—*Continued*

Station	Date	Morning		Noon		Evening	
		Water	Air	Water	Air	Water	Air
	Apr. 14	65	69	69	80	66	74
	Apr. 16	65	71	68	79	68	74
	Apr. 17	68	69	71	76		
Albemarle Isl., Cape Rose	Apr. 26	71.5	71.5			74	77
Albemarle Isl., Villamil	May 1	69.5	71			71	72.5
	May 2	70	71			72	74
Charles Isl.	May 16	69	73			69	75
	May 24	70	71	65	72	66	73
Hood Isl.	June 24	68	69	69	72	69	70
	June 25	68	69	69	72	69	70
	June 26	68	68			69	70
	June 27	69	71	70	72	69.5	70.5
	June 29	69	70	70	72	69	70.5
Chatham Isl.	July 7	66	68			64	68.5
	July 8	63	66	64	69	63	68
Indefatigable Isl., Academy Bay	July 12	68	67.5			69	68
	July 13	67	66	68	68	67	68
James Isl., James Bay	Aug. 7	66	65			67	68
	Aug. 8	66	66			68	68
Albemarle Isl., Cowley Bay	Aug. 10	66	66			68	68
	Aug. 11	67	66	67	73	68.5	68
	Aug. 12	67	66	69	71	68	68
Duncan Isl.	Aug. 15	66	65			67	67
Albemarle Isl., Villamil	Aug. 25	64	64	68	68		
	Aug. 26	65	64	68	69	69	68
	Aug. 31	67	65	69	69	69	68
	Sept. 1	67	65	69	70	69	68
Chatham Isl., Wreck Bay	Sept. 7	63	65			63	67
	Sept. 8	63	65	63	69	64	66

TABLE OF GALAPAGOS TEMPERATURES, 1905–1906—*Continued*

Station	Date	Morning		Noon		Evening	
		Water	Air	Water	Air	Water	Air
Tower Isl.	Sept. 14					73	71
	Sept. 15	71	68	73	74	73	70.5
Bindloe Isl.	Sept. 16					72.5	71
	Sept. 17	72	69			72.5	72
	Sept. 18	71	69				
Abingdon Isl.	Sept. 18					73	72
	Sept. 19	71	70			73	72
	Sept. 20	72	68			72	70
	Sept. 21	70	69			72	70
	Sept. 22	70	70			72	69
Wenman Isl.	Sept. 24			76	74		
Twelve miles west of Wenman Isl.	Sept. 24					76	73
Culpepper Isl.	Sept. 25			76	74.5		

From this table it is seen that the warmest weather of the year occurs in the months of February and March, and the coldest during the months of July, August, and September. There is no great amount of difference in the temperature of the air morning and noon, 5° F. being about the average, while the difference in the temperature of the water is even less than this. The air is usually 1° to 3° warmer than the water in the morning, except during the spring months, when the opposite is the case.

The uniformly low temperature for an equatorial region is due to the coolness of the water which surrounds all but the northernmost islands of the group. The Humboldt current, which sweeps up from the antarctic regions along the west coast of South America, turns outward at about the latitude of these islands and bathes their shores with unusually cool water for several months of the year. The water remains cool until the sun reaches well south of the equator, in the autumn and winter months, when it begins to become warmer until it reaches its highest temperature in February and March. After the sun passes the equator on its way north, the water rapidly becomes cooler, the colder water seeming about to keep pace with the sun on its way north. When we were anchored at Tagus Cove on the west side of Albemarle Island during portions of the months of March and April, a decrease of 14° in the temperature of the water was noticed in nineteen days.

The northern islands of the group were visited but once, and that for a period of eleven days. During this time the water was on the average 6.5° warmer than at the southern islands for the corresponding period just preceding. The difference was due to the fact that the northern islands lie in the lower limits of the Panama current. The following table shows the continued rise in the temperature of the water for some distance north of this part of the Galapagos. These observations were taken on the homeward voyage at 12 m. on the dates mentioned in the table, this being the only time during the day when we knew our position with any degree of accuracy. Of course many of these observations have no bearing on the climatic conditions in the Galapagos Islands, but they may nevertheless be of interest.

Surface Temperatures, 1906

Lat. N.	Long. W.	Date	Water	Air
2° 29′	93° 6′	Sept. 26	78	76
5° 34′	95° 27′	Sept. 27	80	79
7° 23′	97° 48′	Sept. 28	80	76
9° 22′	98° 25′	Sept. 29	81	79
9° 59′	100° 25′	Sept. 30	82	80
11° 53′	102° 9′	Oct. 1	81	81.5
12° 19′	104° 3′	Oct. 2	81	81
14° 24′	106° 42′	Oct. 3	82	81
14° 24′	107° 5′	Oct. 4	82	83
14° 49′	107° 2′	Oct. 5	83	83
14° 45′	108° 30′	Oct. 6	77.5	81
14° 38′	109° 12′	Oct. 7	75	81
14° 40′	109° 26′	Oct. 8	79	81
14° 11′	109° 38′	Oct. 9	78	81
14° 26′	109° 26′	Oct. 10	79	82
14° 36′	109° 42′	Oct. 11	79	82
15° 16′	110° 1′	Oct. 12	81.5	82.5
15° 36′	110° 12′	Oct. 13	83	83
15° 31′	110° 43′	Oct. 14	82	82.5

SURFACE TEMPERATURES, 1906—*Continued*

Lat. N.	Long. W.	Date	Water	Air
15° 54′	112° 8′	Oct. 15	82	82
16° 25′	113° 40′	Oct. 16	80	81
16° 43′	113° 9′	Oct. 17	79.5	81
16° 55′	112° 55′	Oct. 18	81	81
17° 10′	113° 27′	Oct. 19	81	80
17° 30′	114° 6′	Oct. 20	80	79
17° 44′	114° 58′	Oct. 21	80	79
17° 53′	114° 45′	Oct. 22	79.5	79
18° 16′	115° 46′	Oct. 23	79	80
19°	116° 41′	Oct. 24	78	78
19° 53′	118° 1′	Oct. 25	77	75
20° 20′	118° 44′	Oct. 26	75.5	76
20° 37′	119° 17′	Oct. 27	75.5	76
21° 45′	120° 32′	Oct. 28	73	74.5
23° 2′	121° 45′	Oct. 29	73	73
24° 31′	122° 52′	Oct. 30	71	71
25° 25′	124° 20′	Oct. 31	71	71.5
26° 24′	126° 23′	Nov. 1	67	67
26° 50′	126° 30′	Nov. 2	68	69
26° 51′	126° 52′	Nov. 3	67	70
26° 50′	126° 47′	Nov. 4	68	68
28° 20′	127° 58′	Nov. 6	66	67
29° 38′	129° 2′	Nov. 7	67	65
30° 23′	129°+	Nov. 8	66.5	66
30° 33′	130° 58′	Nov. 9	67	67.5
30° 48′	131° 9′	Nov. 10	67.5	66
31° 54′	132° 11′	Nov. 12	67.5	68
33° 7′	134° 6′	Nov. 14	66	66
33° 47′	132° 21′	Nov. 15	67	66
34° 30′	130° 42′	Nov. 17	64.5	64
35° 40′	133° 14′	Nov. 19	64.5	64.5
36° 49′	133° 41′	Nov. 21	60.5	61
38° 10′	134° 35′	Nov. 23	60	57.5

Light

While we were unprovided with instruments for measuring the intensity of light, it could readily be seen by general observation that the light is normally much stronger on the lower parts of the islands than in the middle and upper regions. The weather is often practically clear at sea level, while a few hundred feet up it may be dark and gloomy, the clouds being arrested as they strike the mountains and thus hanging as fog-banks around the sides. Owing to the generally more open arrangement of the vegetation, there is not the same intense struggle among plants to get to the light that was noted in the rain-forests of Cocos Island, some three hundred and fifty miles northeast of the Galapagos.

The most marked effect of light on vegetation is seen among some of the species of the *Cactaceae,* which seldom grow in shaded places, and, when they do so, are much stunted in growth. Specimens of *Plumbago scandens* usually have a deep red color when they grow in direct sunlight, a character that is usually not developed on specimens in the shade.

Winds

The prevailing winds blow from the southeast, east-south-east, and south-southeast, and are the regular trade winds of this part of the Pacific Ocean. They blow quite regularly from June until January, but during the remainder of the year are very uncertain, and the waters surrounding the islands are subject to long periods of calm. Our vessel had to depend entirely on sail, and at one time it required from May 3rd until June 23rd to go from Villamil, on the south side of Albemarle Island, to Hood Island, a distance of about eighty-five miles. We spent two weeks of this time anchored at Charles Island waiting for wind, so that we were actually under way thirty-six days. The calm was so complete at one time during this trip that a flour tin, which was thrown overboard and which happened to light right side up, was still in sight forty-eight hours afterward. There are often light winds during the day in the calm season, but they usually go down in the evening, and unfortunately do not always come up again on the following morning. It is very seldom that the winds come from a northerly direction, and when they do they are usually of short duration. Storms are very rare, but short squalls sometimes occurred several times a day at Tagus Cove on Albemarle Island during the months of March and April. Wolf, in his paper on the Galapagos Islands, mentions similar squalls on Charles Island during the months of August and October, but none occurred on this island at the various occasions we visited it, one of which was in the early part of October. A thunder storm occurred around the top of Narborough Island on March 21st, being the only one seen during the entire year we spent among the islands.

The effect of wind on the growth of vegetation is well shown on the upper parts of Charles Island, where there are several old tufa craters that rise from 500 to 800 ft. above the surrounding table land in the interior of the island. The northern sides of most of these are covered with a heavy growth of lime and lemon trees, on the branches of which there are mosses and other epiphytic plants. The southern and southeastern sides of these craters, on the other hand, have only low perennial herbs and bushes on them above 1350 ft., and only scattered trees for two or three hundred feet below this elevation. The change in the character of the vegetation is so abrupt in these places that the two extremes often occur within a few feet of each other. A somewhat similar but less pronounced condition of affairs is found on the upper part of Chatham Island, where the highest peak is covered on the leeward side with a thick growth of *Lycopodium clavatum* and ferns. Many of these are absent on the windward side, and those species that do persist are only a few inches in height when exposed directly to the action of the wind. Many species of lichens are found growing on the rocks and twigs on this side which are absent on the other. The trees of *Bursera graveolens* lean in a northwesterly direction when they are exposed to the wind, and their branches are often so bent and twisted as to give the trees much flattened crowns.

Soil

The substratum for the most part consists of basaltic lava, lava cinders, tufa, ashes, pumice, products derived from the disintegration of these, sand, or vegetable mold. There are many places in the dry regions where the lava flows are comparatively recent and there is practically no soil at all. Such vegetation as is found there grows entirely from the crevices in the lava. Basaltic lava or lava approaching basalt in character seems to form the best substratum for plants, as the

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densest vegetation in the dry regions, and the largest forest trees in the transition and moist regions, are usually found on lava of this kind or on soil which has been derived from it. On the other hand pumice forms the poorest substratum, and supports only low scattering bushes in places where the moisture is sufficient to support plants of a much larger size. Tufa makes a fairly good soil for the growth of bushes and other shrubby vegetation, but when forest trees occur on soil of this nature they are usually rather scattered and small in size. Where the soil is composed of ashes there usually are grassy areas with scattering clumps of bushes. On beds of cinders there is often very little vegetation of any kind, while beds of basaltic lava adjoining and apparently of about the same age may be covered with a considerable growth of plants.

Vegetable mold only occurs in quantity in the transition and moist regions, the reason being that there is much more vegetation in these regions to form mold, and that this vegetation decays very quickly owing to the larger number of fungi and other low organisms present. This more rapid decay of plants has a corresponding effect upon the disintegration of the lava, which takes place more rapidly than in the dry region. In his paper on the Galapagos Islands, Wolf mentions the great difference in the condition of a single lava flow on the lower and upper parts of Charles Island. Similar conditions can be found on several of the other islands, notably Abingdon, Albemarle, and James, on which there are lava flows the lower parts of which are very barren, while the upper portions are heavily covered with vegetation.

Outside of the lower cryptogamic plants, certain species of the *Cactaceae* seem to be about the first plants to invade the recent lava in the dry regions, while some of the more xerophytic species of ferns are the first in the transition and moist regions. *Cereus nesioticus* was usually found growing on lava, either recent or comparatively recent in origin, on which there were seldom any other higher plants of any size. There are often abrupt changes in the character of the vegetation on the line of contact between two different lava flows, even when the flows are old and both more or less heavily covered with vegetation. A condition of this kind is well marked on the sides of the mountain at Iguana Cove on Albemarle Island, where each flow of lava can be traced for a distance of several miles by the difference in the color of the vegetation. Similar conditions were noticed at Villamil on the south side of this island.

Growth

Owing to the short vegetative period on the lower and drier parts of the Galapagos, growth is very slow among the perennial forms, but correspondingly rapid among the annuals. This fact was observed especially on Chatham Island in January and February. While the greater portion of the spring weeds were well advanced in growth at this place, in the later part of January, some of them were just coming through the ground; while upon a return to the same place, three weeks later, it was found that most of the latter had matured and dried up. In fact most of the vegetation had gone into the resting condition during this time, so that the change in the appearance of the vegetation was very striking.

Some insight was gained into the rate of growth of the *Opuntias* at Academy Bay on Indefatigable Island. In making a trail into the interior in the early part of November, many of the smaller specimens were cut off three or four feet above the ground. It was found in July that many of the cut ends had put forth branches, some of which were as much as sixteen inches long. Many of the absorbing roots of *Cissampelos Pareira* were cut at the same time, and many of these had put forth several rootlets from the cut ends, about one sixth of an inch in diameter and from four to seven feet long. These rootlets do not seem to increase in diameter very rapidly after they are once formed, for the same condition was noticed on an old trail, on the northwest side of this island, that had not been touched for several years.

Origin of the Galapagos Islands

Two different theories have been advanced to explain the origin of these islands. Until the appearance of Dr. Baur's paper: "On the Origin of the Galapagos Islands," [1] it was generally conceded among naturalists that they were of oceanic origin, each island having been built up separately from all of the rest by volcanic activity. In this paper Dr. Baur expressed an entirely different view concerning their origin, basing his

[1] Am. Nat. v. 25, 1891, pp. 217-229, 307-326.

theory principally on the harmonic biological relations which exist between the different islands of the group. In brief Dr. Baur's theory was that the islands had all been connected with each other at some not remote geological period, and at a still earlier period had been attached to the North American continent, possibly in the region of Central America. This view has been supported by some naturalists and vigorously opposed by others. During the year our party remained on the islands excellent opportunities were offered to study the situation from an impartial stand-point, and after having made a careful study of the collections of plants formed on the different islands, the author is led to a view concerning their origin which is slightly at variance with both of the above theories.

If these islands are continental in origin, as was maintained by Dr. Baur, one would naturally expect to find a close faunal relationship between them and the mainland, a condition, however, that does not exist. There are neither large mammals nor batrachians, both of which should be present in greater or less quantity if the islands had been connected with the mainland within even comparatively recent geological times. Furthermore, with the exception of the large land tortoises, which are found on most of the larger islands of the group, the fauna is about what one would expect to find on almost any group of oceanic islands.

It might be maintained that during the great volcanic disturbances that have taken place since the islands were separated from the mainland, both the mammals and batrachians were exterminated. While this might be true as far as the mammals are concerned, it would hardly be true for the batrachians, as they would very likely be able to withstand as adverse conditions as the reptiles, and it is hardly probable that a combination of circumstances would come about which would obliterate one of these groups and leave the other in a more or less flourishing condition.

One of the strong arguments in favor of a former land connection is the presence on the islands of the well-known land tortoises, which are rather closely related to certain fossil tortoises from some of the later geological formations of North America. The presence of land tortoises on the islands is not so difficult to explain as it appears to be at first sight. While these animals are large and unable to swim, they are able to keep afloat for a considerable time, long enough to float them from the mainland to the islands if we assume that the ocean currents were as strong and had the same general trend in past geological times as they have now. The ability that these animals have of living without food for a considerable time greatly strengthens this view. During our homeward voyage from the islands, in the autumn of 1906, our live specimens of tortoises went for over a month without food, a time sufficiently long, under favorable conditions, to float an individual from the mainland of North America to the islands, if one should happen to get adrift. It would not be absolutely necessary that both male and female tortoises should be introduced on the islands to start the race, for this could be accomplished if a single female specimen containing fertilized eggs should be cast upon the shores of the islands.

Turning to the botanical side of the question, we would naturally expect that of the eighty families of vascular plants found on the islands some few at least would have approximately the same number of genera and species as are found in these same families on the mainland. The following table shows all of the families of vascular plants which contain ten or more species, varieties, forms, and indeterminate species.

Families of Galapagos Plants with Ten or More Species, Varieties, or Forms

Rank	Family	No. of Species, Varieties, and Forms	Indeterminate	Total
1	Filices	77		77
2	Compositae	65	4	69
3	Euphorbiaceae	50	10	60
4	Gramineae	49	6	55
5	Leguminosae	45	8	53
6	Amarantaceae	33		33
7	Cyperaceae	25	3	28
8	Solanaceae	19	7	26
9	Rubiaceae	22	1	23
10	Malvaceae	19	3	22
11	Boraginaceae	20	1	21
12	Convolvulaceae	15		15
13	Verbenaceae	13	2	15

Of the above thirteen families of vascular plants, the *Filices* contain the largest number of species; and these, owing to the small size of their spores, would obviously possess greater opportunity of being disseminated over considerable stretches of water than the plants of any other family in the list. Furthermore the small number of endemic species of ferns leads naturally to the supposition that there is a more or less constant introduction of spores from the mainland, thus checking any strong tendency for the species of ferns on the islands to vary greatly from those on the mainland. This supposition is supported by the fact that each collecting expedition brings to light more continental species that were not previously known to occur on the islands.

While it is no doubt true that great changes in the biological conditions must have taken place on the islands if there had been sufficient subsidence to separate them from the mainland by the depth of water that now exists, it is nevertheless not likely that the changes thus brought about would have been great enough to exterminate many families completely and to reduce all others so greatly in number of genera and species as is the case. Some genera and species would have probably become extinct if there had been a great disturbance in the biological conditions; but at the present time most families are represented by more genera on the mainland than species on the islands.

From the above facts there appears to be little evidence to show that there has ever been a land connection between the islands and the mainland, yet there is no very strong evidence opposed to the view that the islands may have been connected with each other, at some not distant geological period, either as one large island or as two or three smaller ones. The rather remarkable harmonic zoological relationships existing between the different islands, as shown by Dr. Baur, are more easily explained by supposing such a condition, than if each island had been formed separately. The following table, which shows the Pteridophytes and Spermatophytes common to the different islands, lends support to this theory.

SPECIES COMMON TO THE ISLANDS OF THE GALAPAGOS GROUP

	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Abingdon	119	99	18	26	11	79	80	3	49	3	23	35	75	80	25	34	26	16	6
Albemarle	..	325	29	36	10	173	175	2	75	2	35	58	145	169	32	69	34	15	7
Barrington	..	..	48	11	7	33	36	2	20	1	23	29	27	22	14	18	19	10	2
Bindloe	..	..	..	47	4	33	29	2	13	1	14	18	27	24	10	18	11	10	5
Brattle	..	..	..	..	16	12	13	1	4	2	6	10	11	10	3	6	7	5	5
Charles	..	..	..	..	..	319	188	4	75	2	44	66	123	124	32	52	38	16	6
Chatham	..	..	..	..	..	..	306	2	69	3	31	60	128	121	30	56	38	18	7
Culpepper	..	..	..	..	..	..	..	7	2	1	4	3	2	2	1	2	2	1	1
Duncan	..	..	..	..	..	..	..	..	103	0	24	45	59	64	24	25	23	9	4
Gardner Ch.	..	..	..	..	..	..	..	..	..	5	1	2	3	2	0	2	1	2	2
Gardner Hd.	..	..	..	..	..	..	..	..	..	..	48	37	30	27	13	13	20	11	4
Hood	..	..	..	..	..	..	..	..	..	..	..	79	49	47	16	26	26	13	4
Indefatigable	..	..	..	..	..	..	..	..	..	..	..	..	193	111	32	45	38	13	7
James	..	..	..	..	..	..	..	..	..	..	..	..	..	224	29	46	27	13	6
Jervis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	42	14	13	7	1
Narborough	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	80	15	8	4
Seymour	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	52	8	5
Tower	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	22	6
Wenman	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14

Another fact which agrees with the theory that there has been a former land connection between at least many of the islands, is the shallowness of the water between most of them. An elevation of one hundred fathoms would connect all the southern islands, and a rise of seventy-one fathoms would bridge all of these except Chatham, Hood, and James, so far as the soundings that have been taken show. The only deep soundings known are between Abingdon and Wenman, 1189 fathoms, between Bindloe and James, 684 fathoms, and between James and Tower Islands, 885 fathoms, depths of water which are not difficult to account for if one does not maintain too strongly that all of the islands were formerly connected into a *single* large one.

Considering the volcanic nature of the islands, the general shallowness of the intervening water lends support to the subsidence theory, for it is hardly likely, if all of the bed of the ocean between the islands had been formed by marine volcanic activity, that the lava would have been so evenly distributed over this bed without leaving at least a few abysses. The gradual deepening of the water away from the shores of many of the islands also supports the subsidence theory, especially when we consider the fact that the slope of the submerged portions of some of the islands approximates the slope of the lower parts above water.

While all of the above facts seem to point to a general subsidence of the islands, there are a few evidences of elevation. On both Indefatigable and Seymour Islands there are deposits containing a considerable number of marine fossils which have been elevated a few feet above the level of the sea. The greatest amount of elevation seems to have taken place on Albemarle Island. Snodgrass and Heller, of the Hopkins-Stanford Expedition to the Galapagos Islands, thought that they detected signs of elevation at Tagus Cove on the west side of this island. There is evidence of some elevation at the south end of Albemarle, concerning which Mr. W. H. Ochsner, the geologist of the Academy's expedition, has been kind enough to furnish the following information:

"About one and one half miles inland from the settlement near Turtle Cove on the south shore of Albemarle Island, there is exposed a rather large remnant of an old sea beach. The deposit exists as white sands several feet thick and composed entirely of the fragments of coral, molluscan and echinoid, and other calcareous marine forms.

The deposit rests on a nearly level and extensive lava flow with a greatest observed elevation of about 60 ft. above the present sea-level. Where the sands have been hardened into crusts in thin layers, they carry abundant and nicely preserved specimens of marine molluscan and echinoid forms.

"Toward the interior and higher levels of the island the deposit exists only as little island-like exposures which have escaped the great recent flow of lava that has poured down over this old beach to conceal its exact and higher levels of distribution. This deposit should be placed as late Pliocene or early Quarternary."

Outside of the few localities mentioned above, there is no evidence of a general elevation, so far as has been observed, and it is not improbable that during the period of general subsidence there might have been times in which it ceased and during which local elevation took place. Mr. Ochsner states further: "I am much in favor of the theory of subsidence. With additional thought and study given the matter I feel that the testimony of my collected facts and observations will go to prove this theory nearly a fact."

In conclusion it might be said that however true Dr. Baur's theory may be in regard to the union of the islands into one large one, there is no strong evidence to show that they were ever connected with the mainland. The biological conditions at the present time are more against this theory than for it. The botanical conditions do not offer absolute proof that the islands have ever been connected with each other, but the weight of the evidence is more in favor of this theory than against it.

Origin of the Flora

If it be assumed that the Galapagos Islands are of oceanic origin, there are but three means by which seeds and spores could have been brought to the islands, outside of the agency of man. These are: winds, oceanic currents, and migratory birds.

Winds

If winds were an important agent in bringing seeds and spores to these islands, those families of plants which have the smallest seeds and spores would be the most apt to be distributed in this way. Of all the families of vascular plants none are better adapted for wind distribution than are the ferns. Such being the case, there should be a larger number of species of ferns on the islands common to the region from which the prevailing winds blow than from any other. As the winds around these islands are almost constantly from the southeast, the fern flora should be most closely related to that of the central and southern part of South America. Such is not the case, however, for outside of fifteen species which are of wide distribution, the fern flora shows nearly as strong affinities with that of Mexico as it does with that of South America. There are on the islands fifty-four species common to Mexico and fifty-six to South America. Moreover, the majority of the latter belong only to the northern part of the continent.

Devices for wind dissemination are not common on the seeds of Galapagos plants, the *Compositae* being the only one of the larger families which has this character pronounced to any extent.

Oceanic Currents

The northern islands of the group, viz. Abingdon, Bindloe, Culpepper, Tower, and Wenman, lie in the direct path of the Panama current, and the water surrounding them is several degrees warmer than that around the southern islands, which are bathed by the Humboldt current. If oceanic currents were an important factor in the transport of seeds to the Galapagos, those islands which are washed by the Panama current should be more closely related botanically to the Mexican and Central American regions than the islands lying in the Humboldt current; and the latter islands, on the other hand, should have a flora more closely related to that of the western coast of South America. Furthermore, the several islands of each group should have a larger floral element common among themselves than with any of the islands of the other group. The following table shows the percentages of floral relationships between the islands of the northern group, as well as their relationships with some of the more important islands of the southern group.

FLORAL RELATIONSHIPS OF NORTHERN ISLANDS

	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Tower
Abingdon.....	..	83.1	..	..	..	66.3	67.2	..
Bindloe......	55.3	76.5	..	..	..	68.5	61	..
Tower.......	72.7	68.1	48.4	48.4	..	72.7	81.8	..
Wenman.....	38.5	50	..	35.7	35.7	38.6	50	38.5

From the above table it is seen that in the majority of instances the islands of the northern group have a larger percentage of their floras common with the islands of the southern group than with each other, a condition hardly to be expected if oceanic currents were an important factor in transporting seeds to them. Robinson (1), p. 258, has already mentioned the small chance that many seeds would have of surviving even if they were washed up on the shores of the islands, a fact that can not be too strongly emphasized. While it is entirely possible that the seeds of xerophytic plants might be able to grow if they were cast up in this way, it is hardly likely that mesophytic plants would be able to survive, because there are but two places on the islands—at the present time—where conditions at sea level are such as to offer them a suitable habitat. One of these places is Iguana Cove, Albemarle Island, and the other is Villamil on the same island, at neither of which places are there plants which do not have a wide distribution over the islands. While it is possible that the Humboldt current may be responsible for much of the xerophytic flora, it is hardly likely that the Panama stream could have played much of a role in this respect, as it flows from a region in which the flora is anything but xerophytic in character.

Birds

I am indebted to Mr. Edward W. Gifford, joint ornithologist to the expedition, for the following list of birds occurring as migrants and stragglers on the Galapagos Islands.

Arenaria interpres	Turnstone	Common
Heteractitis incanus	Wandering Tattler	Common
Phalaropus hyperboreus	Northern Phalarope	Great numbers of phalaropes, probably this species, were seen passing through the archipelago.
Ægialeus semipalmatus	Semipalmated Plover	Fairly common
Numenius hudsonicus	Hudsonian Curlew	Fairly common
Calidris arenaria	Sanderling	Fairly common
Limonites minutilla	Least Sandpiper	Fairly common
Querquedula discors	Blue-winged Teal	Fairly common

Squatarola helvetica	Black-bellied Plover	Not common
Tringoides macularius	Spotted Sandpiper	Not common
Dolichonyx oryzivorus	Bobolink	Not common
Hirundo erythrogaster	Barn Swallow	Not common
Larus franklini	Franklin's Gull	A chance visitor
Stercorarius pomatorhinus	Pomarine Jaeger	A chance visitor
Symphemia semipalmata	Willet	A chance visitor
Helodromas solitarius	Solitary Sandpiper	A chance visitor
Pandion haliaëtus	Osprey	A chance visitor
Heteropygia bairdi	Baird's Sandpiper	Rare; one taken by Harris Expedition
Steganopus tricolor	Wilson's Phalarope	Rare; three taken
Querquedula versicolor	Brilliant Teal	Rare; one said to have been taken by Kinberg

Mr. Gifford states further: "With the exception of *Querquedula versicolor,* all of these species occur in the United States. *Q. versicolor* is a straggler from South America. The others probably occur each year in about the numbers indicated. The Galapagos Islands seem to be out of the general route of migratory birds, being too far out to sea."

Of the twenty birds of Mr. Gifford's list, three are common, five are fairly common, nine are not common, and three are rare. While this list of birds is not large, the number of species of plants that are found on the islands is correspondingly small, and when one considers the fact that almost any kind of plant, whether halophytic, xerophytic, or mesophytic, which should happen to be introduced, would find a suitable habitat on some part of many of the islands, it is not unreasonable to suppose that if the islands have been visited pretty constantly by a small number of birds for a long time, quite a large number of plants might have been introduced by them. While migratory birds must not be considered as the only factor in distribution, they seem in this instance to be the most important cause, as the presence of many of the plants found on the islands, especially those of a mesophytic character, can be explained in no other way.

The following table, which has been compiled from various sources, shows the number of species, varieties, and forms in each family that are endemic, and also those which are common to the regions indicated at the heads of the different columns.

The next to the last column shows the total number of species, varieties, and forms in each family of vascular plants found on the islands, while the final column gives the number of species that are indeterminate.

Affinities of the Galapagos Flora

	Endemic	U. S.	Mexico	W. Indies	S. Amer.	Old World	General	Species, Varieties, and Forms	Indeterm.
Filices	2	4	54	47	57	21	15	77	
Salvinaceae		1	1		1			1	1
Equisetaceae			1	1	1			1	
Lycopodiaceae		2	3	3	3	1	2	5	
Potamogetonaceae							2	2	
Najadaceae					1			1	
Gramineae	16	9	11	14	15	7	11	49	6
Cyperaceae	6	6	8	8	9	1	8	25	3
Lemnaceae							1	1	1
Bromeliaceae	1							1	
Cannaceae									1
Commelinaceae							1	1	1
Iridaceae									1
Amaryllidaceae			1	1	1		1	2	1
Orchidaceae	1		1	1				3	1
Piperaceae	7		1	1	1			8	2
Urticaceae	1		2	2	3		2	6	
Loranthaceae	4							4	
Polygonaceae	1	1	2	2	2			3	
Chenopodiaceae									3
Amarantaceae	26		1		5		2	33	
Batidaceae							1	1	
Basellaceae			1	1	1			1	
Phytolaccaceae		1	2	2	2			2	
Nyctaginaceae	1	4	4	4	5			7	
Aizoaceae	5						2	7	1
Portulacaceae							1	1	2
Caryophyllaceae							1	1	
Anonaceae		1	1	2	1			2	
Menispermaceae	1						1	2	
Cruciferae							5	5	

Affinities of the Galapagos Flora—*Continued*

	Endemic	U. S.	Mexico	W. Indies	S. Amer.	Old World	General	Species, Varieties, and Forms	Indeterm.
Crassulaceae		1	1	1	1			1	
Leguminosae	6	3	22	17	27	4	10	45	8
Oxalidaceae	1				1		1	3	
Linaceae					1			1	
Zygophyllaceae	3						1	4	1
Rutaceae		1	1	1	1			1	
Simarubaceae	6							6	
Burseraceae	1		1	1	1			2	
Polygalaceae	3							3	
Euphorbiaceae	43	2	2	2	2		5	50	10
Callitrichaceae									1
Celastraceae	1							1	
Sapindaceae	1	2	2	2	2		2	5	
Rhamnaceae	1							1	
Vitaceae			1	1	2	1		2	
Tiliaceae			1	1	1		1	2	
Malvaceae	2	2	6	4	4	3	10	19	3
Hypericaceae			1		1			1	
Sterculiaceae	3							3	
Turneraceae							1	1	
Passifloraceae	1	2	2	2	2			3	
Caricaceae							1	1	
Loasaceae		1	2	1	2			2	
Lythraceae					1		1	2	1
Cactaceae	7							7	3
Rhizophoraceae							1	1	
Myrtaceae	1						2	2	
Combretaceae							2	2	
Melastomaceae	1							1	
Onagraceae							1	1	
Halorrhagidaceae									1
Umbelliferae	1				1	1	2	5	
Plumbaginaceae							1	1	
Apocynaceae	1	1	1	1	1			2	
Asclepiadaceae	1	1	1	1	1			2	

AFFINITIES OF THE GALAPAGOS FLORA—*Continued*

	Endemic	U. S.	Mexico	W. Indies	S. Amer.	Old World	General	Species, Varieties, and Forms	Indeterm.
Convolvulaceae	6	1	1	3	2	2	5	15	
Hydrophyllaceae			1		1			1	
Boraginaceae	13		2	2	4		3	20	1
Verbenaceae	4	4	5	3	7		2	13	2
Labiatae	2	2	5	5	5	1		7	
Solanaceae	5	1	2	1	6	7		19	7
Scrophulariaceae		3	3	3	5			5	
Bignoniaceae									1
Acanthaceae	1	1	2	1	3			4	
Plantaginaceae	1						1	2	
Rubiaceae	17	2	3	3	4		1	22	1
Cucurbitaceae	2						3	5	
Campanulaceae		1	1	1	1			1	
Goodeniaceae							1	1	
Compositae	44	2	8	3	9		9	65	4
Total	252	62	171	149	207	49	123	615	67
Percentage	40.9	10.08	27.8	24.22	33.65	7.96	20		

Total number of species, varieties, forms and indeterminate species 682.

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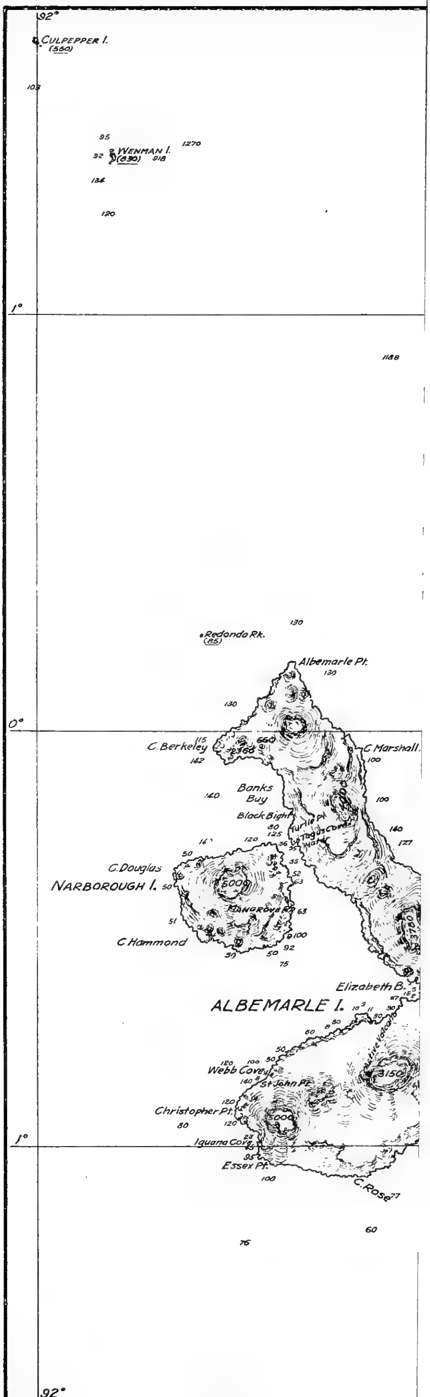
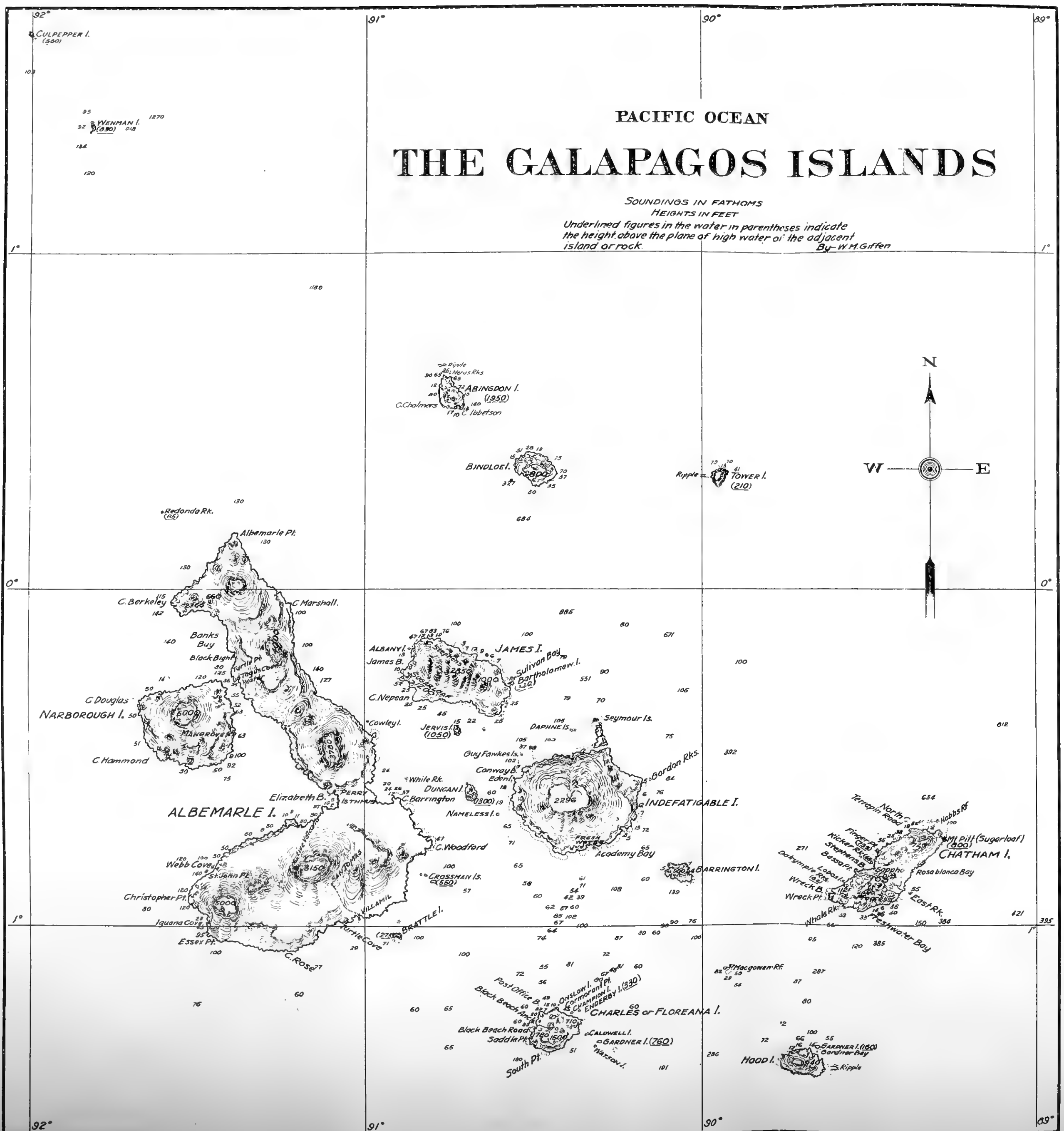
(Roman numbers indicate pages where the respective genera and families receive their principal treatment; italic numbers show the pages on which the names are mentioned or occur as synonyms.)

New Species, Forms, and Varieties Described


92°
CULPEPPER I.
(560)
WENMAN I.
(830)
1°
Redondo Rk.
(85)
Albemarle Pt.
0°
C. Berkeley
C. Marshall.
Banks Buy
Black Bight
Turtle Pt.
Tagus Cove
C. Douglas
NARBOROUGH I.
Mangrove Pt.
C. Hammond
Elizabeth B.
ALBEMARLE I.
Webb Cove
St John Pt.
Christopher Pt.
Iguana Cove
Essex Pt.
C. Rose
1°
92°


PACIFIC OCEAN
THE GALAPAGOS ISLANDS
Soundings in fathoms
Heights in feet
Underlined figures in the water in parentheses indicate the height above the plane of high water of the adjacent island or rock.
By W. M. Giffen
N
W
E
Culpepper I.
Wenman I.
Abingdon I.
C. Chalmers
C. Ibbetson
Bindloe I.
Tower I.
Redonda Rk.
Albemarle Pt.
C. Berkeley
C. Marshall
Banks Bay
Black Bight
C. Douglas
Narborough I.
C. Hammond
Albany I.
James B.
James I.
Sulivan Bay
Bartholomew I.
C. Nepean
Cowley I.
Jervis I.
Daphne Is.
Seymour Is.
Guy Fawkes Is.
Conway B.
Eden I.
Gordon Rks.
White Rk.
Duncan I.
C. Barrington
Nameless I.
Indefatigable I.
Academy Bay
Barrington I.
Elizabeth B.
Perry Isthmus
Albemarle I.
C. Woodford
Crossman Is.
Webb Cove
Christopher Pt.
Iguana Cove
Essex Pt.
C. Rose
Turtle Cove
Villamil
Brattle I.
Post Office B.
Black Beach Road
Saddle Pt.
South Pt.
Onslow I.
Champion I.
Enderby I.
Charles or Floreana I.
Caldwell I.
Gardner I.
Watson I.
Macgowen Rf.
Hood I.
Gardner Bay
Terrapin Road
Hobbs Rf.
Mt. Pitt (Sugarloaf)
Chatham I.
Rosa blanca Bay
Kicker Rk.
Stephens B.
Wreck B.
Wreck Pt.
Whale Rk.
East Rk.
Freshwater Bay
Dalrymple Pt.
92°
91°
90°
89°
1°
0°

EXPLANATION OF PLATE II

Drawn by F. S. Mathews

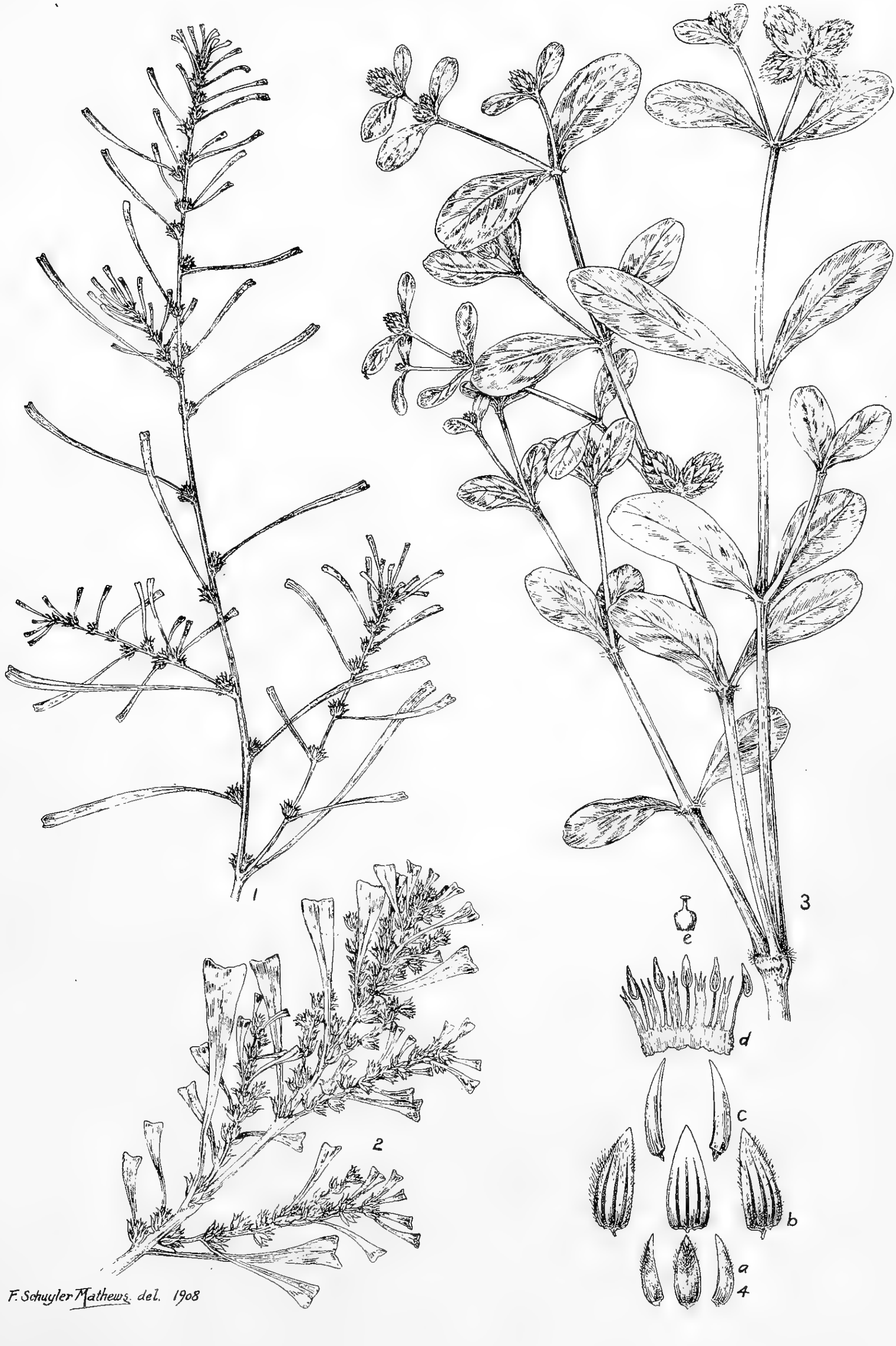
Fig. 1. *Amaranthus sclerantoides* Anderss. forma *abdingdonensis* Stewart n. forma. × 1.

Fig. 2. *Amaranthus sclerantoides* Anderss. forma *albemarlensis* Stewart n. forma. × 1.

Fig. 3. *Telanthera galapagensis* Stewart n. sp. × 1.

Fig. 4. *Telanthera galapagensis* Stewart, dissected flower. × 4.

a bracts.
b external sepals.
c internal sepals.
d stamens.
e pistil.


1
2
3
a
b
c
d
e
4
F. Schuyler Mathews. del. 1908

EXPLANATION OF PLATE III

Drawn by F. S. Mathews

Fig. 1. *Euphorbia equisetiformis* Stewart n. sp. × .5.

Fig. 2. *Euphorbia equisetiformis* Stewart, flower. × 2.

Fig. 3. *Euphorbia Stevensii* Stewart n. sp. × 1.

Fig. 4. *Euphorbia Stevensii* Stewart, flower. × 4.

Fig. 5. *Euphorbia articulata* Anderss. variety *bindloensis* Stewart n. var. × 1.

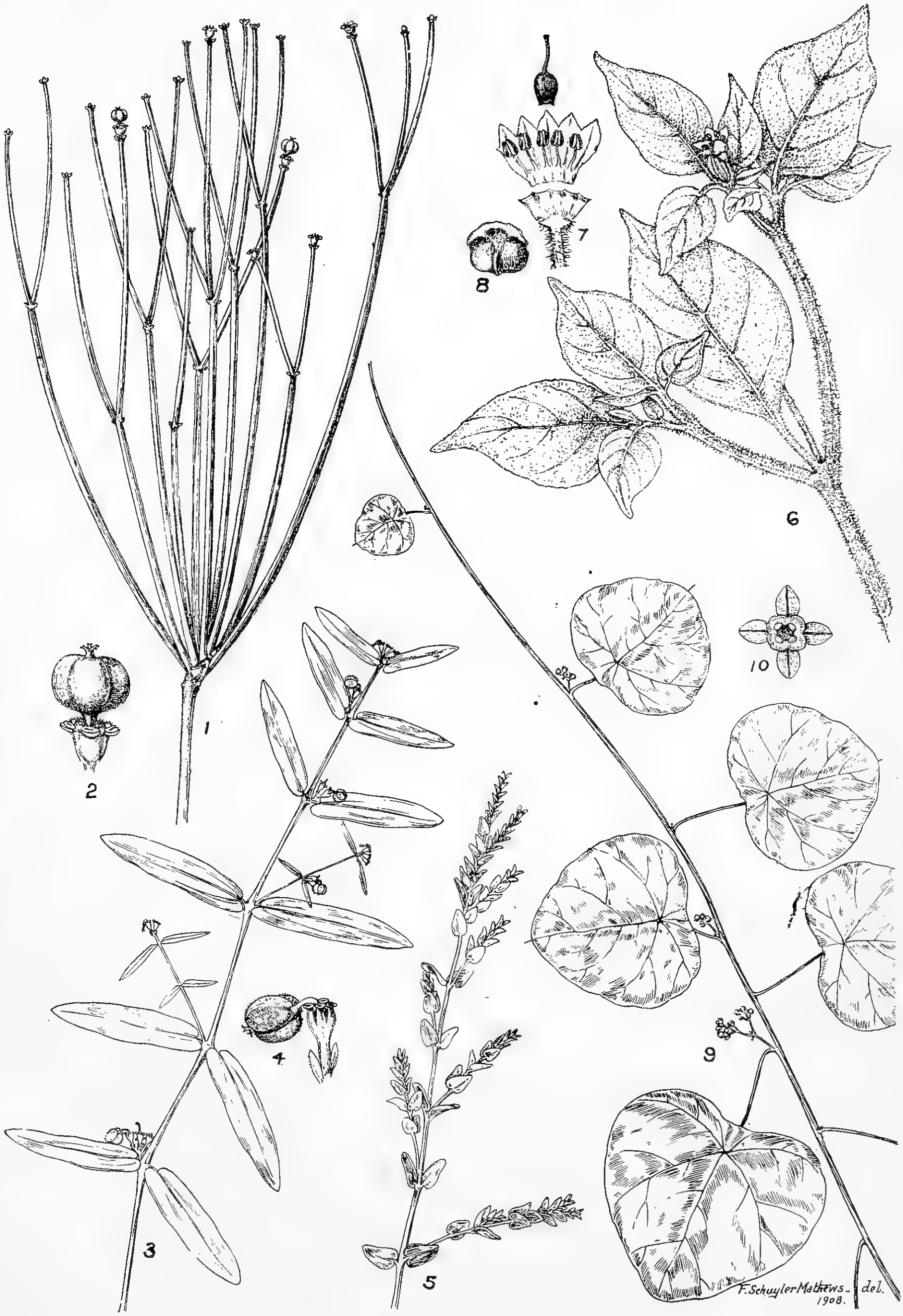
Fig. 6. *Brachistus pubescens* Stewart n. sp. × 1.

Fig. 7. *Brachistus pubescens* Stewart, dissected flower. × 2.

Fig. 8. *Brachistus pubescens* Stewart, fruit. × 2.

Fig. 9. *Cissampelos galapagensis* Stewart n. sp. × .5.

Fig. 10. *Cissampelos galapagensis* Stewart, flower. × 4.


1
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4
5
6
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8
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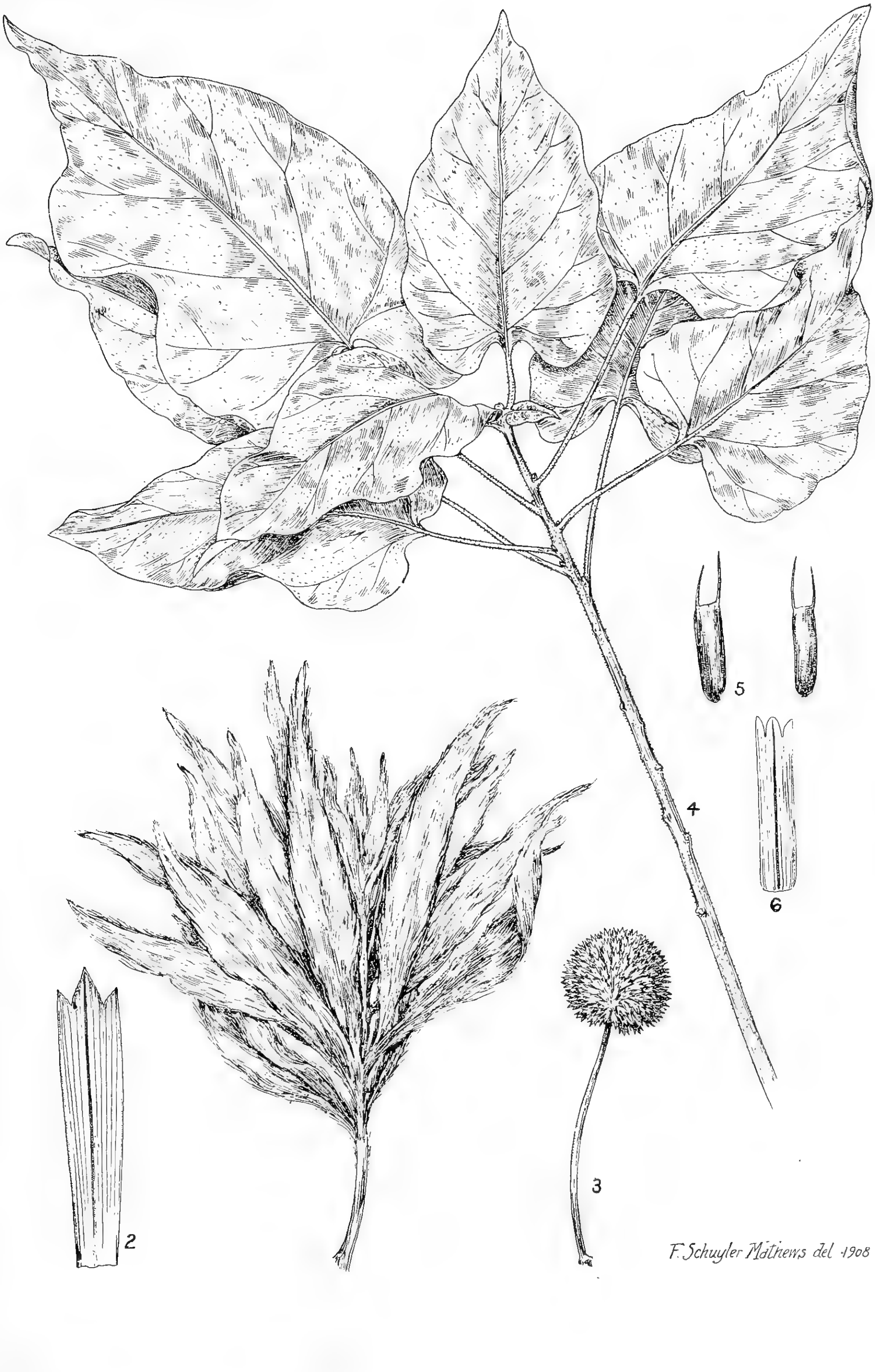
10
F. Schuyler Mathews del. 1908.

EXPLANATION OF PLATE IV

Drawn by F. S. Mathews

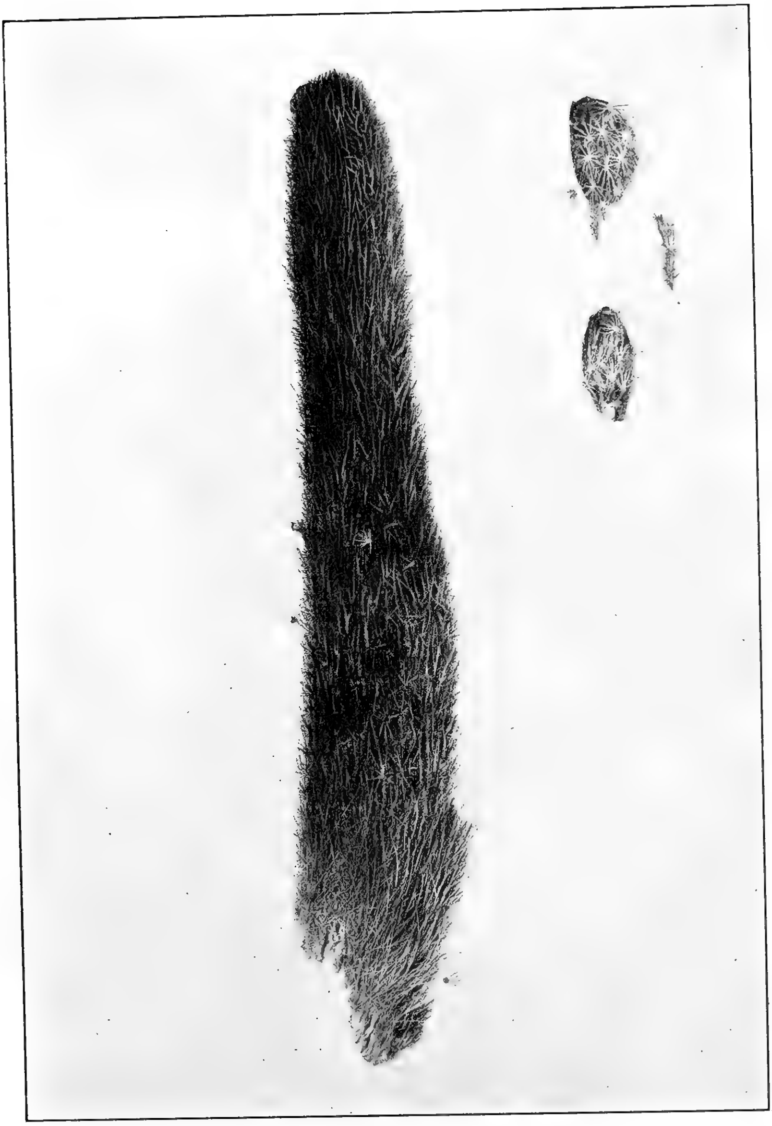
Fig. 1. *Scalesia villosa* STEWART n. sp. × .5.
Fig. 2. *Scalesia villosa* STEWART, squame. × 4.
Fig. 3. *Scalesia villosa* STEWART, flower head. × .5.
Fig. 4. *Scalesia cordata* STEWART n. sp. × .5.
Fig. 5. *Scalesia cordata* STEWART, squame. × 4.
Fig. 6. *Scalesia cordata* STEWART, fruit. × 4.


2
3
4
5
6
F. Schuyler Mathews del 1908

EXPLANATION OF PLATE V

Photographed by R. E. Shuey

Cereus nesioticus K. SCH., branch and fruit. × .38.



EXPLANATION OF PLATE VI

Photographed by R. H. Beck

Cereus sclerocarpus K. Sch., covering the side of a cliff at Academy Bay, Indefatigable Island.

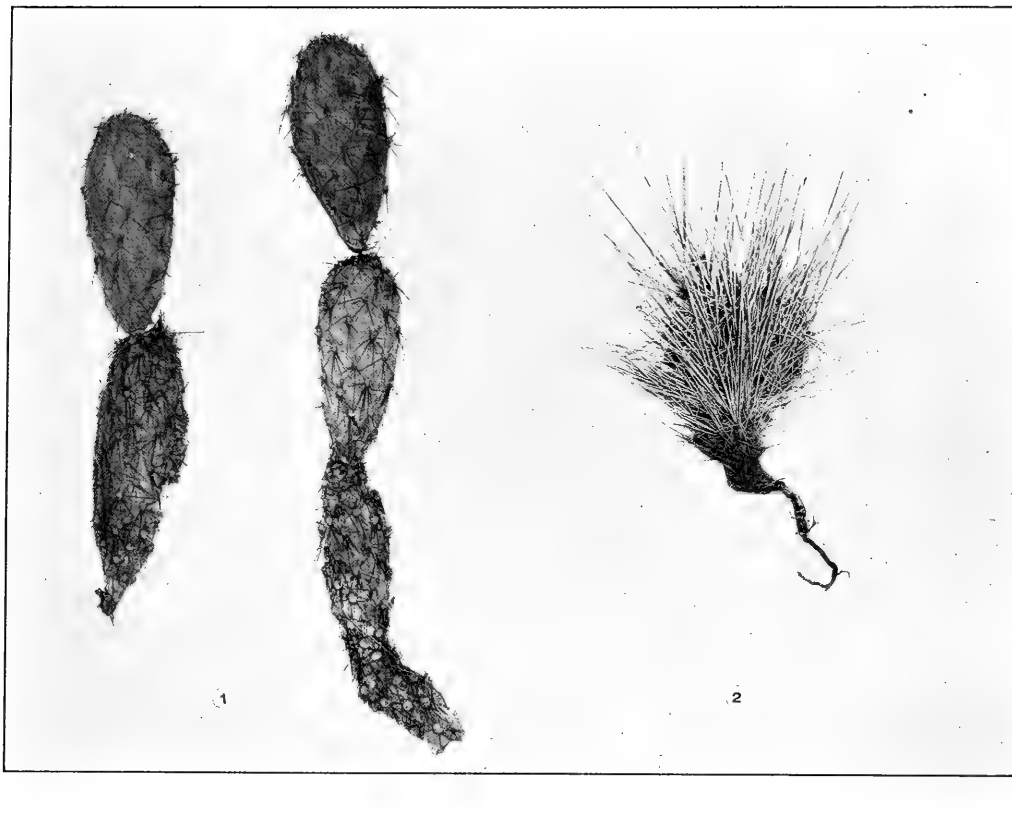
January 17, 1911.

EXPLANATION OF PLATE VII

Photographed by R. E. Shuey

Fig. 1. *Opuntia myriacantha* WEBER, young specimen from Indefatigable Island. × .436.

Fig. 2. *Opuntia galapageia* HENSL., young specimen from Hood Island. × .42.

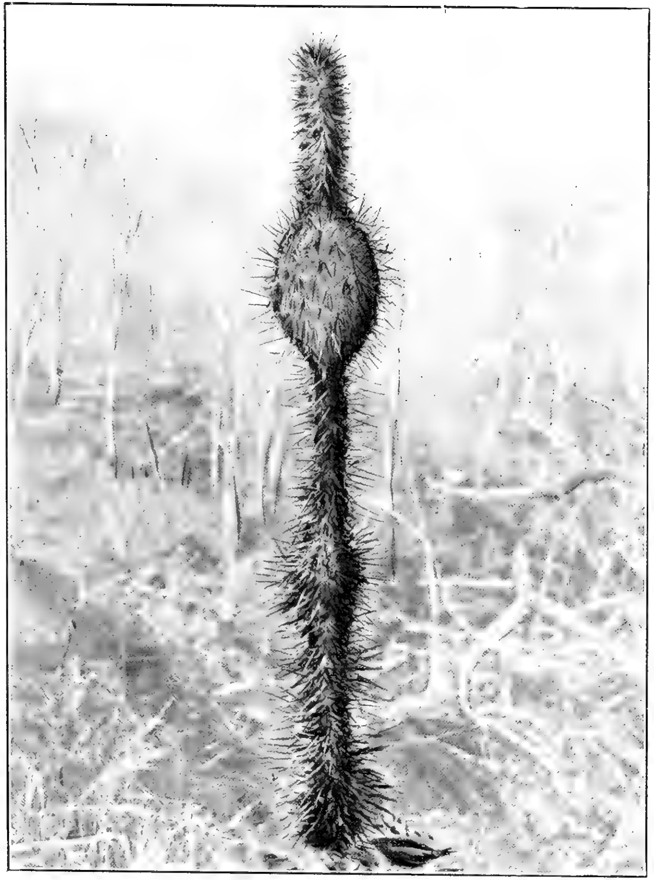


EXPLANATION OF PLATE VIII

Photographed by E. W. Gifford

Fig. 1. *Opuntia galapageia* Hensl., young specimen from Hood Island. × ca. .105.

Fig. 2. *Opuntia galapageia* Hensl., partly grown specimen from Hood Island. × ca. .033.

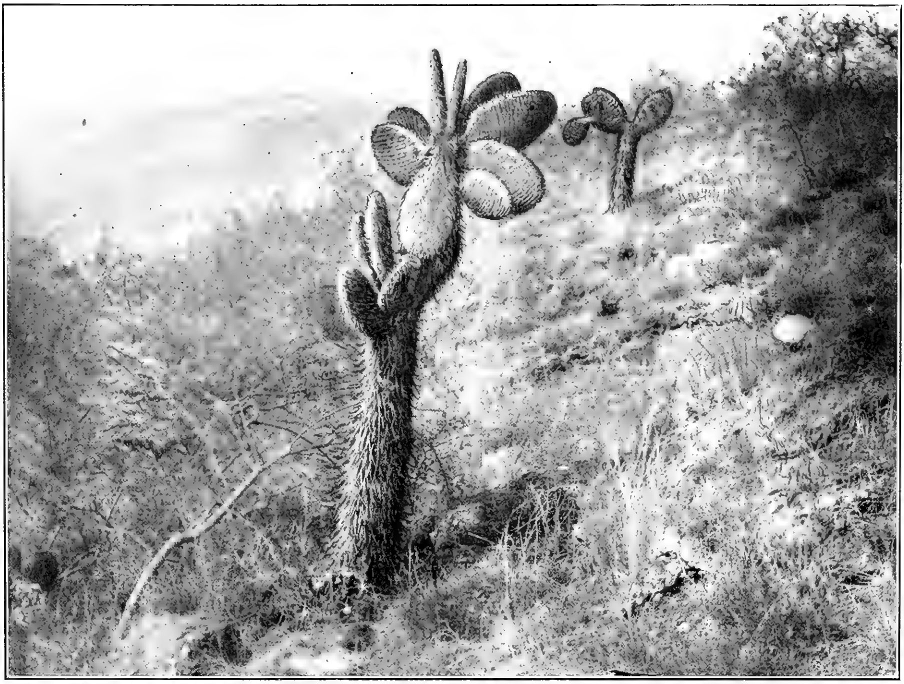


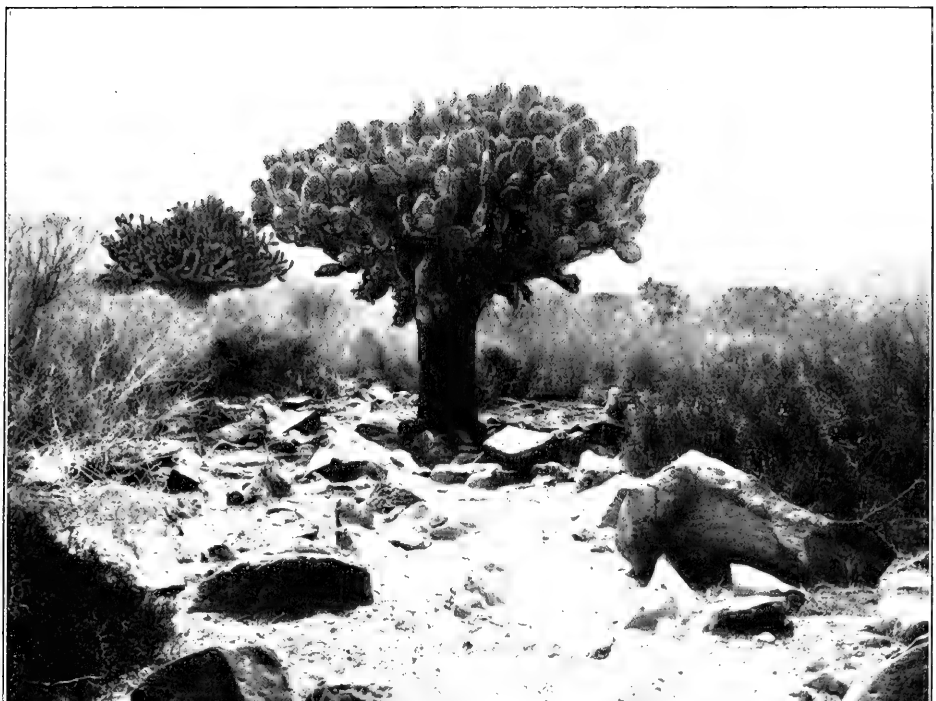
EXPLANATION OF PLATE IX

Photographed by E. W. Gifford

Fig. 1. *Opuntia insularis* STEWART, specimen from Tagus Cove, Albemarle Island.

Fig. 2. *Opuntia galapageia* HENSL., mature specimen from Hood Island with closely arranged branches.





EXPLANATION OF PLATE X

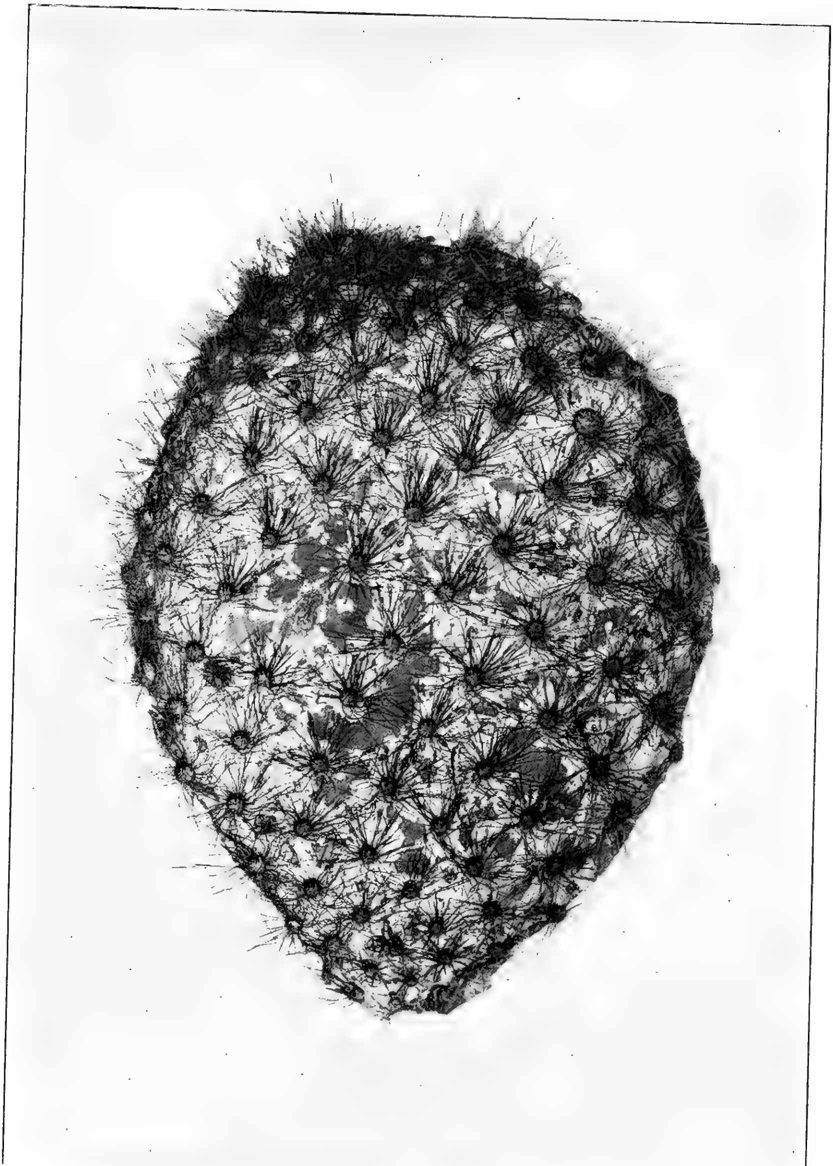
Photographed by R. H. Beck

Opuntia galapageia HENSL., mature specimen from Duncan Island with open branching.

EXPLANATION OF PLATE XI

Photographed by R. E. Shuey

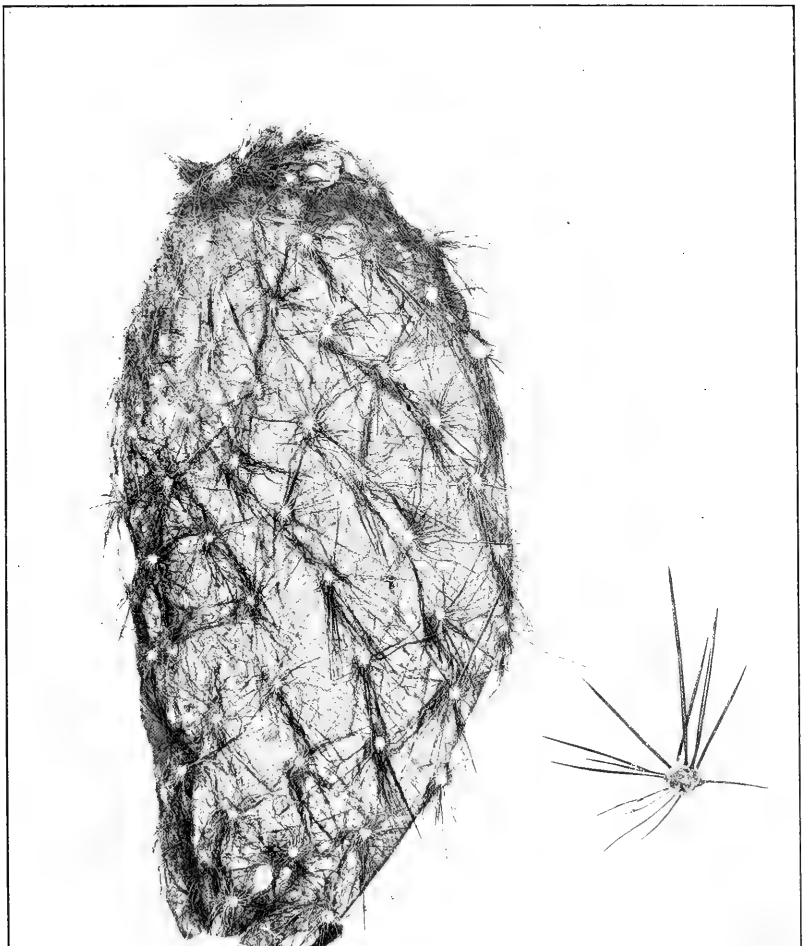
Opuntia galapageia HENSL., specimen of a branch from Abingdon Island. $\times$ .393.



EXPLANATION OF PLATE XII

Photographed by R. E. Shuey

Opuntia galapageia HENSL., specimen of a branch from Charles Island. × .38. This specimen contains both stiff and capillary spines in the fascicles, in which respect it is intermediate between *O. galapageia* and *O. myriacantha.*



EXPLANATION OF PLATE XIII

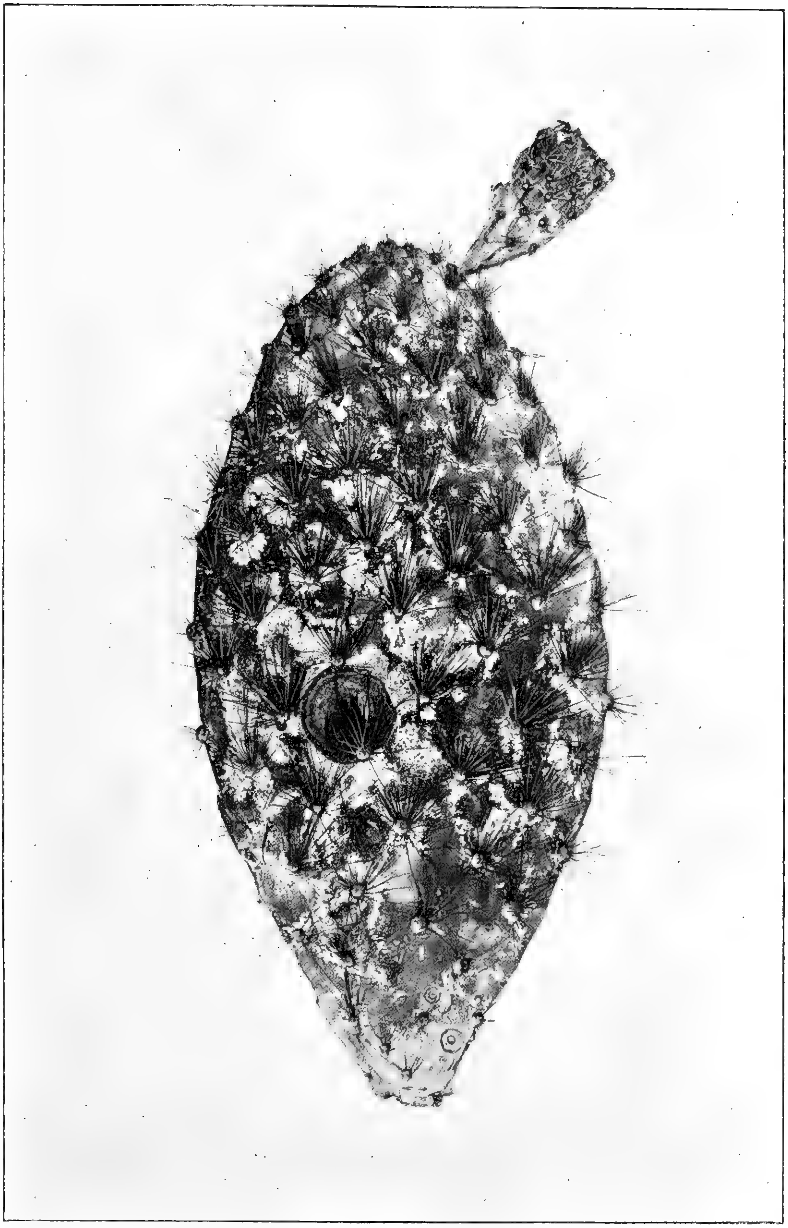
Fig. 1. *Opuntia Helleri* K. SCH., thicket on Tower Island. Photographed by E. W. Gifford.

Fig. 2. *Opuntia myriacantha* WEBER, specimens from Academy Bay, Indefatigable Island, showing the pendant branches. Photographed by R. H. Beck.

EXPLANATION OF PLATE XIV

Photographed by R. E. Shuey

Opuntia Helleri K. SCH., branch of a specimen from Wenman Island. × .444.

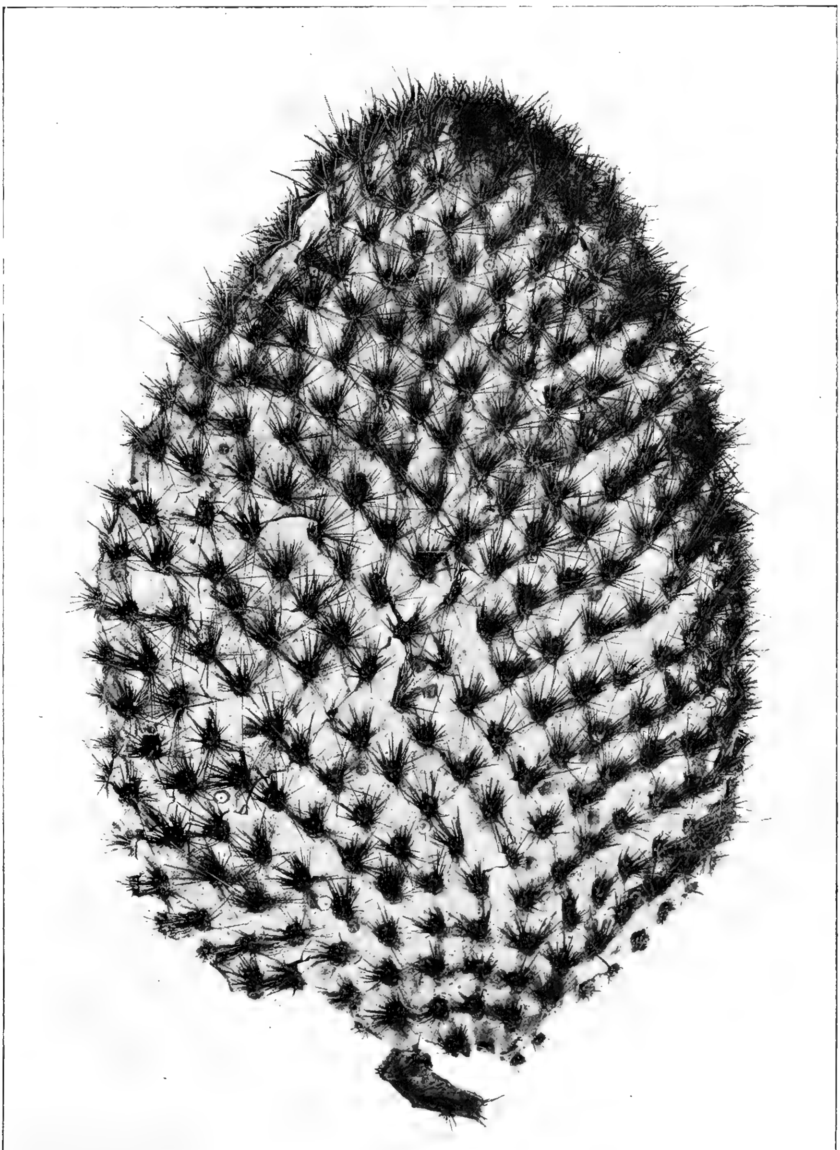


January 17, 1911.

EXPLANATION OF PLATE XV

Photographed by R. E. Shuey

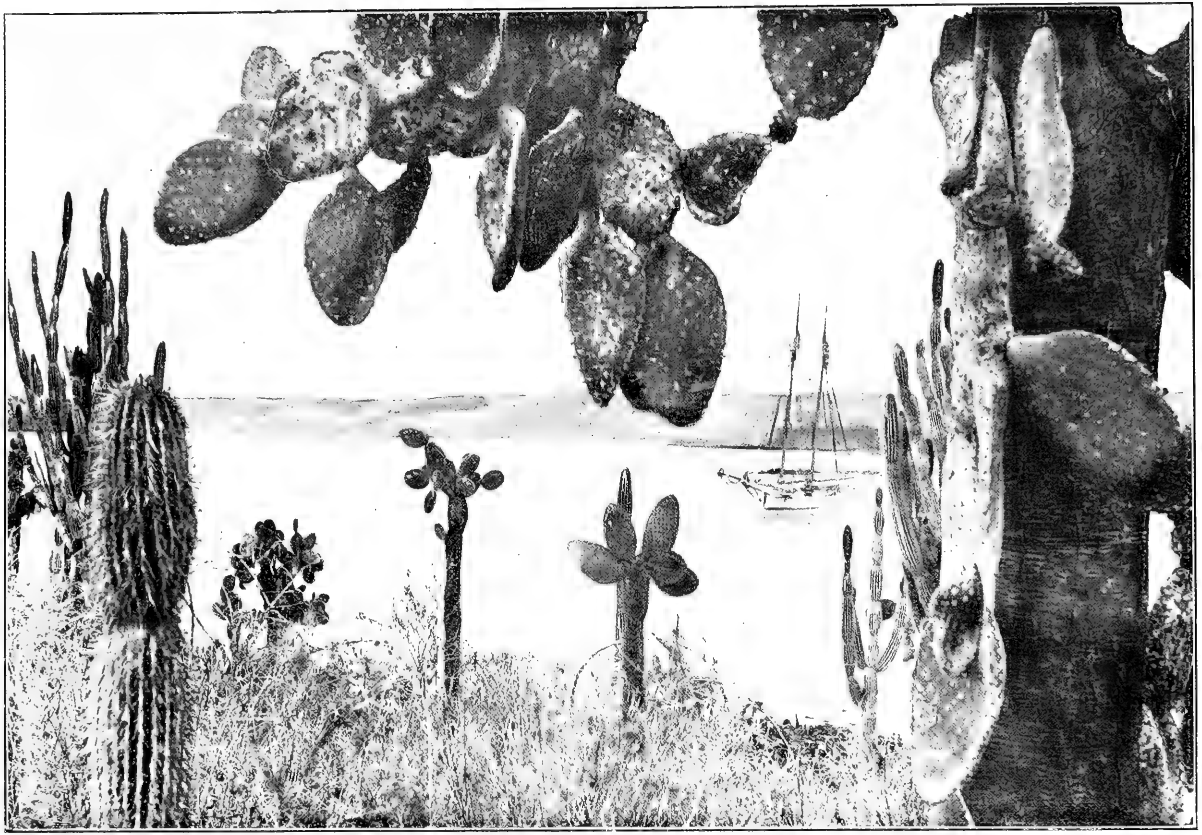
Opuntia insularis Stewart, n. sp., specimen of a branch from Tagus Cove, Albemarle Island. $\times$ .437.



EXPLANATION OF PLATE XVI

Photographed by R. H. Beck

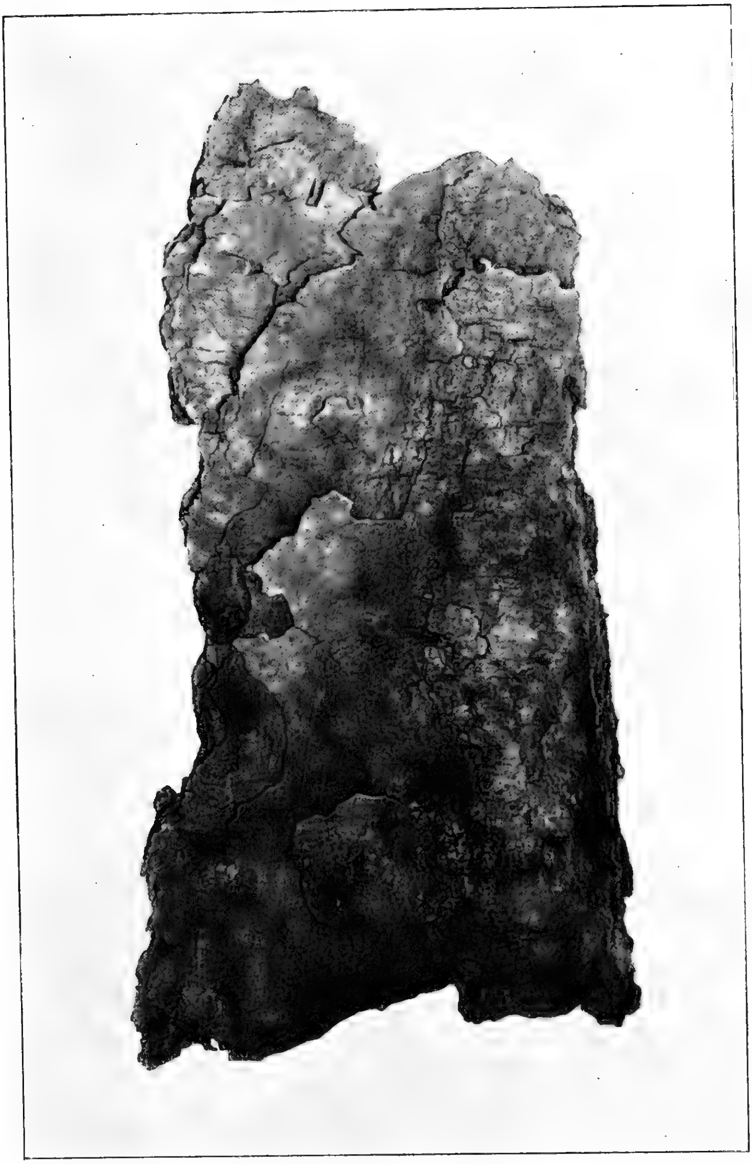
Opuntia myriacantha Weber, specimen from Academy Bay, Indefatigable Island, showing the character of the trunk and pendant branches.



EXPLANATION OF PLATE XVII

Photographed by R. E. Shuey

Opuntia myriacantha Weber, bark from a specimen on Barrington Island.



EXPLANATION OF PLATE XVIII

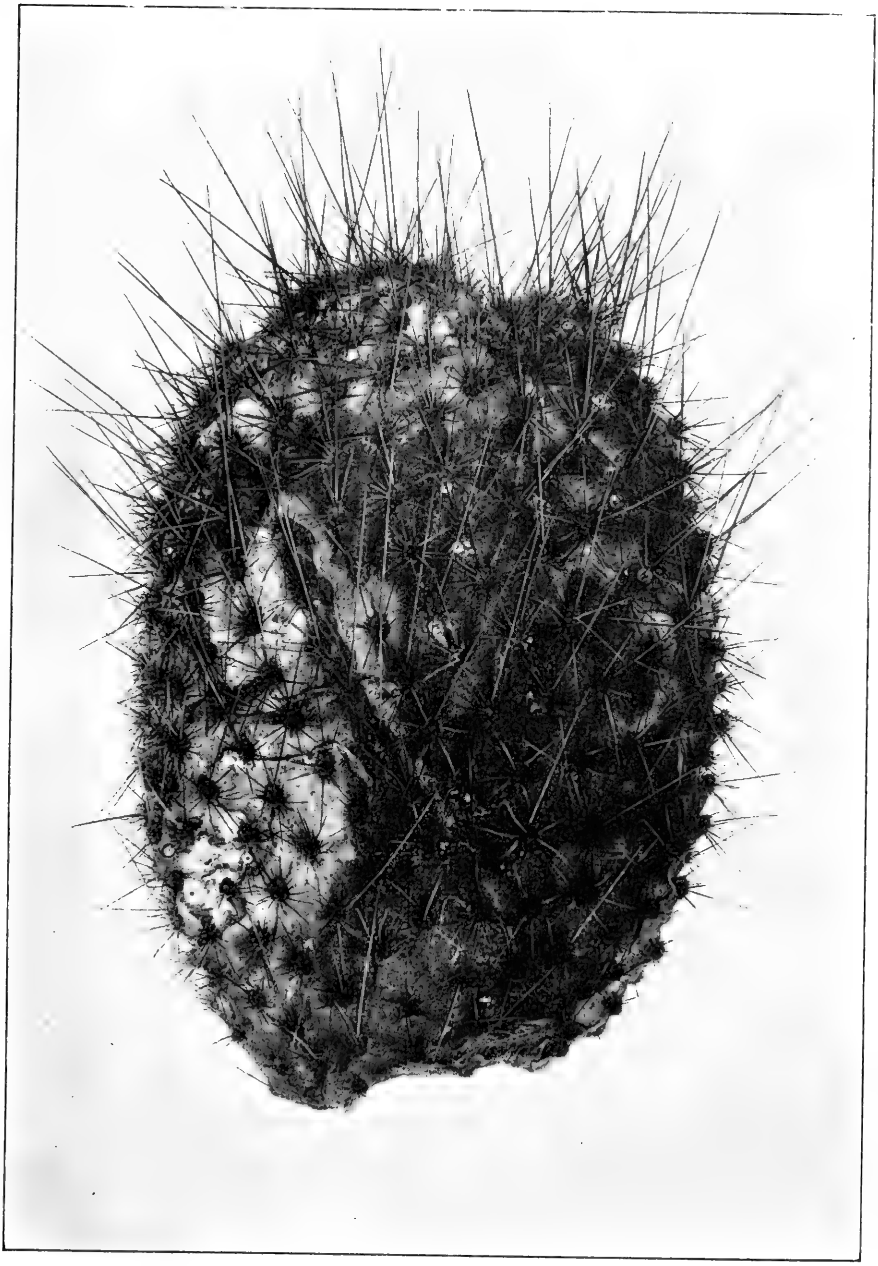
Photographed by R. E. Shuey

Opuntia myriacantha WEBER, specimen of a branch from Barrington Island. × .365.

EXPLANATION OF PLATE XIX

Photographed by R. E. Shuey

Opuntia species, specimen of a branch from South Seymour Island. $\times$ .444.



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III

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BY

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Assistant Curator of Entomology, Kansas University,
Entomologist to the Expedition

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PLATES XX-XXI

[1] Unless otherwise stated all the specimens collected on this expedition are in the collection of the California Academy of Sciences, at San Francisco.

September 18, 1911

Introduction

The author regrets that he is unable to include in this paper all the species of Lepidoptera collected on the islands, for while this order is scantily represented in the region under consideration, the smaller and less conspicuous forms present difficulties which would cause considerable delay; and rather than to permit this, he has deemed it advisable to publish at present the butterflies and Sphinges with such observations on other Galapagos Lepidoptera as may assist in showing the facies of this fauna and in rendering an explanation of its origin and development.

A single fauna need not be treated in its entirety to show its relationships with others, though where possible, the whole fauna should be studied.

The Galapagos Archipelago (belonging to Ecuador) is situated on the equator, about 600 miles from the west coast of South America, and a little more than 700 miles from Veragua, with Cocos and Malpelo Islands intervening. This group is therefore considerably closer to the mainland than are some other oceanic islands, as the Hawaiian Islands, 2350 m.; St. Helena, 1100 m.; the Azores, about 900 m.; and the Bermudas, about 700[1] m. I have considered the Galapagos as oceanic as regards their natural history; whether they issued in the first place from the bed of the ocean, or whether they were of continental origin, provided they were once completely submerged,[2] or all living organisms thereon otherwise totally destroyed simultaneously by volcanic activity, as the flora and fauna would still be of oceanic character, *i. e.,* transported across water to the islands, a condition that the writer believes has happened. To quote Wallace in his "Island Life," the Galapagos Archipelago "occupies a space of about 300 by 200 miles. It consists of five large and twelve small islands; the largest (Albemarle Island) being about eighty miles long and of very

[1] These figures are taken from Wallace's "Island Life." According to F. M. Jones (Ent. News XXI, 165, 1910), the Bermudas are 575 nautical miles from Cape Hatteras, North Carolina.

[2] There is good evidence that the Galapagos Archipelago was once one large island which by subsidence has formed the many smaller islands. This view makes it easier for us to explain the existence on all or most of the islands of closely allied species or varieties.

irregular shape, while the four next in importance—Chatham, Indefatigable, James, and Narborough Islands, are each about twenty-five or thirty miles long, and of a rounded or elongate form—these are situated in a comparatively calm sea, where storms are of rare occurrence, and even strong winds almost unknown. They are traversed by ocean currents which are strong and constant, flowing towards the northwest from the coast of Peru." This, a portion of the great antarctic drift, has the effect of making the climate of these islands, tropically situated, quite temperate. Seldom indeed, then, is the heat excessive, and it appears never to become really cold during any period of the year. The northern extremity of the group is influenced somewhat by the Panama current, so that it is noticeably warmer there than farther south, though the natural history does not appear to be modified in any manner thereby.

Lava of various ages occurs on all the islands, and forms at least their exterior surface in a large measure. Narborough, for instance, is covered almost entirely, from its huge crater over 4000 feet high to the very sea-level, with a layer of recent lava. Only here and there along its sides and base and perhaps summit exist strips or patches of older layers, supporting a meager flora and fauna. All the larger islands, especially Albemarle, have great fields of lava. Charles and Chatham, two of the more southern islands, could be, and are sometimes considered (as regards external appearance) as the oldest islands of the group. They have plenty of good rich soil and their various craters are well rounded and sometimes almost obliterated. The upper areas of the higher islands, especially on their weather side (S. E. in this case) where the moisture first strikes them, have an abundance of humus and vegetation. With a few exceptions, the lowlands are quite arid and of desert character.

For some hundreds of years, the Galapagos Islands have been visited by various ships and were formerly a favorite resort of the buccaneers who were numerous in the region.

In 1835, the Galapagos were visited by Charles Darwin in the "Beagle"; in 1852, by Prof. N. J. Andersson, in the Swedish frigate "Eugenie"; in 1868-9, by Dr. A. Habel; in 1871, by Prof. A. Agassiz of the "Hassler Expedition"; in 1875, by

Dr. Theodor Wolf, State Geologist of Ecuador, and by Commander Cookson of the "Petrel"; in 1884, by Lieutenants Chierca and Marcacci; in 1888, by L. A. Lee of the "Albatross Expedition"; in 1891, by Prof. A. Agassiz on the "Albatross," also by Prof. Geo. Bauer and his assistant; in 1898-99, by Messrs. Snodgrass and Heller of the Hopkins-Stanford Expedition; and finally in 1905-06, by the Expedition of the California Academy of Sciences. The last expedition had, besides the navigator and the first mate and steward, a staff of eight men representing the departments of Zoology, Entomology, Conchology, Botany, Geology and Palaeontology. A full year, of the seventeen months of the Expedition, was spent in the Archipelago, and although much time was lost by reason of the little two-masted schooner "Academy" drifting about the Pacific in calm weather, all the islands and many of the "mere rocks" of the group were visited at least once, and a number, several times, and from different points and during various seasons. Thus the Expedition, equipped for the special purpose of studying and collecting specimens of natural history, was able to bring together a far larger and more varied assemblage of specimens than was collected perhaps by the sum total of all the previous expeditions to these islands. It is only fair to bear in mind, however, that a number of the earlier expeditions were handicapped by lack of time, equipment, and sufficient and capable collectors; nevertheless, the results of their labors are very creditable when we consider the paucity of the Galapagos fauna, the general rough character of the country, and the fact that in some cases, the collecting and studying of specimens of natural history was but a secondary or incidental matter.

The zonal divisions of the fauna and flora of the Archipelago are very interesting. The plant zones on the windward (S. E.) side of the more lofty islands are often quite distinctly defined and can be observed from several miles at sea. The Zoological regions conform in a greater or less degree to those of the flora. The south and southeast sides of Indefatigable Island, show these zones very nicely,[1] and a brief discourse on them will give

[1] While the zones may be distinct on the weather side of an island, the opposite or dry side of the latter displays no such well-defined areas, hence the arid belt *de natura* extends much higher up on that side, while the humid areas are forced far up the slopes and are of quite limited extent, if at all present.

the reader an idea of their character (Plate XXI). The upper or humid portion of the island (500 feet and up) is very difficult of access owing to the dense tangle of vines and scarcity of water. The island was not explored above 1000 feet altitude, therefore the character of the vegetation above about 1400 feet was not satisfactorily ascertained, but by means of observations through binoculars and by observing the slopes and summits of other high and more accessible islands of the group, a doubtful idea of the "Brown Zone" was obtained.[1] Indefatigable Island is about twenty-five miles in diameter and nearly circular in outline, and is situated a little south of the center of the main Archipelago. Its height is estimated at a little over 2200 feet, but it appears fully 3000 feet high. The slope from shore to summit is very gradual and comparatively uniform, and the lower or arid area of much greater extent than the more elevated humid regions. The summit of Indefatigable Island probably contains a large crater. This portion of the island is very commonly enveloped in clouds. The two well-defined life areas, the arid and the humid, can each be subdivided into regions of a less distinct character, and the former are connected with each other by a species of transition or "Big Tree" zone which has a lighter green appearance than the "Green" zone above it.

Commencing at the shore line, we find the "Arid" zone skirted by a littoral flora composed largely of such trees as *Rhizophora mangle,*[2] *Avicennia officinalis, Hibiscus tiliaceus,* the poisonous *Hippomane mancinella,* and the stout creeping vine, *Ipomoea pes-capræ.* Usually the above mentioned plants do not occur inland any distance, except sometimes about bodies of water.

Proceeding towards the interior of the island, one passes through nearly two miles of rough desert-like country where there is but little soil but an abundance of lava. Here the two genera of *Cactaceæ* (*Cereus* and *Opuntia*), *Croton scouleri,*

[1] Indefatigable Island has been selected for the illustration of the zones on account of the well-defined appearance of the latter there. It must be borne in mind that elsewhere in the Archipelago, they are on the whole, far less distinct.

[2] I am indebted to Mr. Alban Stewart, botanist to the expedition, for a number of the botanical names given in this paper. In the proceedings of the California Academy of Sciences, Vol. I, 4th Ser., pp. 206-211, Mr. Stewart gives the botanical regions and zonal elevations more in detail.

the majority of the *Acaciæ, Gossypium, Cordia lutea,* etc., occur plentifully, sometimes forming thickets. Roughly estimated, this zone extends to a height of about 200 feet where it merges into the "Big Tree" zone, in which we find the handsome Guava tree (*Psidium galapageium*), *Pisonia floribunda,* and one or two others. Here is a thin covering of soil, small ferns cover the rocks, and the country loses a great deal of its desert aspect. This zone is somewhat ill-defined as to its lower limits. From the "Big Tree" zone, one enters quite abruptly into the "Dark Green" or really humid zone where the soil is rich and the conspicuous vegetation made up in large part of delicate ferns, several species of *Convolvulaceæ* among the vines, and *Scalesia pedunculata,* a tall composite of graceful form. The growth here is really luxuriant, and being composed of matted vines and some shrubs (the mass reaching a height of about eight feet), it is nearly impenetrable without the aid of a machete. Every now and then, a pretty little grove of tall Cannas is met with; going higher up, the *Scalesia* thins out and the dreary slope presents a rather gloomy appearance. This is a very extensive zone, reaching from 400 or 450 feet to far up the mountain. Above this to the summit, the slope appears equally or more impenetrable, but the color of the above "Brown Zone" suggests lichen-covered trees, taller ferns, with perhaps here and there an open grassy space. Above 400 or 500 feet, there is much humidity and the precipitation must be considerable throughout the year.

The rainy season which lasts from about December to about April, has the effect of making the lower zones fresh and verdant for a short period, and of awakening the insect life which lies dormant there. A little while after the commencement of the rainy season (at which time it is a little warmer), insects appear in comparative abundance; and various shrubs and vines support large numbers of Lepidopterous larvæ, principally *Sphingidæ* and *Noctuidæ,* which though not of many species, are conspicuous by reason of their abundance. At the same time, the enemies of these insects appear. The large greenish *Calosomas* (*Calosoma Howardi, Linell*), search the bushes diligently for larvæ, and do not hesitate to attack and overcome large Sphingid caterpillars. The giant centipedes

(*Scolopendra*) some 9½ inches long, must also destroy numbers of the larvæ.

By the month of May or June, the lower levels resume their desert aspect and insect life is largely dormant. The upper regions however, enjoy a more continued rainfall and have seasons that are necessarily more continuous, so that in the late months of the year, insects do not appear to be much diminished in numbers. There are certain portions of the lower levels, especially about the brackish bodies of water at sea level, which are not sufficiently affected by the rainless season to be unproductive at that time of the year.

From observations and by deduction from the seasonal table of Rhopalocera (at the end of this paper), I have arrived at the conclusion that from the middle of February to the middle of March, is the height of the season for adults, in those regions at least which are influenced by the seasonal rains, *i. e.,* the lower areas; while above in the mountains, as heretofore stated, the seasons are not well marked, for insects in general appear more or less continuously.

On the whole, the lower zones seem richer in insect life, the densely verdant portions of the islands not yielding very much entomologically, but the more open summits of some of the islands support a good variety of insect life. The tall graceful *Scalesia* growing in the humid regions, supports quite a beetle fauna, as do the various *Acaciæ,* the *Crotons,* and the *Bursera* of the "Arid" zone. Inasmuch, however, as a single insect will sometimes feed on one species of plant in the dry zone and upon another in the humid, as often happens, it results that the ranges of such insects are more extensive than that of the flora. Other insects which do not appear to be directly dependent upon the flora, are nevertheless confined to a well-defined area. This is true of some of the species of the littoral or coast fauna. The climate of the Galapagos is not really tropical (as regards rainfall, heavy atmosphere, etc.), neither is the insect fauna typically tropical; and this is probably also true to a degree with regard to the rest of the fauna as well as the flora.

If we compare the Galapagos Islands with the small but beautiful Cocos Island lying several degrees to the northeast, it will be found that though the latter is in warmer waters than the Galapagos and much nearer the mainland, the insect fauna of this little island although quite meager, is of a distinctly more tropical aspect. The island is covered with good-sized trees festooned with vines, and apparently possesses a few clear areas. The climate is warm, the atmosphere heavy, and there is water everywhere in the form of creeks and cascades, but dense forests do not support a rich insect fauna. Only two species of butterflies were taken on Cocos Island, and neither of them occur in the Galapagos. One is an *Aganisthos* (probably *odius*), the other is a species of delicate build which has not yet been determined. Two Sphinges were seen there, one the wide-spread *Phleg. cingulata,* the other which was not taken, suggested the large *Pachylia ficus.*

The butterflies of the Galapagos Archipelago number six species, two of which were taken for the first time on this expedition. These latter species are *Pyrameis huntera* and *caryæ.* Both are rare in the islands. The *Sphingidæ* number eight, two, *Triptogon lugubris* and *Theretra tersa,* are here reported for the first time from the islands, the former species being plentiful, the latter rare.

RHOPALOCERA

Callidryas eubule, Linn.
Agraulis vanillæ, Linn. var. Galapagensis, Holland.
Pyrameis huntera, Fabr.
Pyrameis caryæ, Hubner.
Cupido parrhasioides, Wallengren.
Eudamus galapagensis, N. Sp. (Williams).

PIERIDAE

1. **Callidryas eubule** Linn. Syst. Nat., p. 743, 1766. Holland. Proc. U. S. N. M., XII, 195, 1889.

Holland (Proc. U. S. N. M., XII, 195, 1889), says: "Differs in no respect from the forms taken commonly in the Southern United States and West Indies." The Galapagos specimens are certainly more referable to the form *sennæ* as described by William H. Edwards (Trans. Am. Ent. Soc. IX, 9, 1881), being "generally smaller than *eubule,*" the ♀ having the deeper color of the *sennæ*. There are a number of *Callidryas* from the Galapagos Islands in the Leland Stanford University Collection, including sixteen ♀♀. Mr. E. J. Newcomer has kindly examined these specimens for me and is of the opinion that all the ♀♀ are *sennæ,* as probably also the ♂♂. The insects, as can be seen from the measurements below, average considerably smaller than those from Southern California and some other portions of the United States, and some of the small specimens seem to indicate the dwarfing effects of the arid regions of the islands. *Sennæ* according to Edwards, inhabits Brazil, Central America, Mexico, Texas, Jamaica, Hayti, etc., and is taken in Southern California. Following the smaller size of the Galapagos *Callidryas,* is the blunter apex of the primaries and inner angle of the secondaries.

Eubule is an abundant insect and the most conspicuous butterfly of the Archipelago, having about the same distribution as *Agraulis vanillæ galapagensis,* and in favorable years, is probably to be found on all but the two northern islets, Wenman and Culpepper, and the other mere rocks. It occurs abundantly at moderate and low altitudes, and is rarer on summits. From February to April, 1906, it was plentiful in the vicinity of Wreck Bay, Chatham Island, and on Albemarle in the vicinity of the Villamil settlement, where it was sometimes seen gathered in numbers about cattle droppings. At Tagus Cove (Albemarle), it was common during March and April, especially at the yellow flowers of *Cordia lutea* and *Gossypium* Sp., resting on the blossoms of the latter in dull weather. At Bank's Bay (Albemarle), in April, they were observed feeding at the flowers of *Opuntia* growing near the seashore.

The season for adults ended in general, in May, at the lower levels. During early October however, the insect was abundant at 1000 feet elevation; a few were seen during the same month on Charles Island in the dry zone, and in the "Green Zone" on South Albemarle.[1]

[1] I have noticed that the Galapagos *eubule* do not possess as strong or rapid a flight as those found on the mainland, where I have observed them in Lower California and in Kansas, and this inferiority in flight is quite striking.

But little of the early stages were noted. Oct. 15, 1905, a ♀ was observed ovipositing on the legume *Cassia picta,* and several half-grown larvæ were found feeding on the same plant in the "Green Zone," of South Albemarle, in early September, 1906. Occurs on Charles, Chatham, Indefatigable, Albemarle, James, Narborough, Abingdon Islands, and probably on Hood, Duncan, Bindloe, Jervis, and Barrington Islands.

Taken also on the Albatross Expeditions in 1888 and 1891 (where it is referred to by Agassiz as *Colias*[1]), Hopkins-Stanford Expedition, and perhaps also on some of the earlier expeditions.

Alar expanse: ♂ 44, 44, 51, 56, 56, 56, 56, 58, 60, 62, 64, 64, 64, 64, 65, 66, 66, 67, 67, 70, 72 mm.=60.6 mm.

♀ 38, 60, 61, 63, 70 mm.=58.4 mm.

26 specimens.

NYMPHALIDAE

2. **Agraulis vanillae** Linn., Syst. Nat., 482, 1758, var. Galapagensis, Holland., Proc., U. S. Nat. Mus. XII, 194-5, 1889.

Holland's description reads: "The form of *A. vanillæ* in the collection ticketed 'Chatham Island' differs in some respects so decidedly from the typical form as to well deserve a varietal name. It is characterized by its smaller size, by the darker and more fuscous tint of the basal half of the wings, by the great increase in breadth of all the black markings on both surfaces, and the almost entire obliteration of the white dots by which the spots in the cell on the upper surface of the primaries are pupiled in typical specimens. One specimen, Galapagos, Chatham Islands."

It is therefore quite a different appearing insect from typical *A. vanillæ* and might rightly be raised to specific rank. In *Galapagensis,* the less sinuate outer margin of the primaries (probably resulting from the dwarfing of the insect), gives the latter a much blunter aspect than those of our *A. vanillæ*. From Holland's description of the species, I judge the type to be a male. The female varies somewhat in color, for it may be as in typical *vanillæ,* darker with heavier black markings

[1] Bull Mus. Comp. Zool., XXIII, 68, 1892.

and the ground color yellowish beyond the cell of the primaries; or perhaps more commonly the pale yellow color occupies the greater portion of the primaries, becoming darker and mingled with fuscous basally, and at the inner margin; the pattern is as in typical *A. vanillæ* but the markings are a good deal heavier.

A. vanillæ galapagensis is a fairly common butterfly, occurring on all the larger islands of the group where it is ordinarily restricted to the dryer levels where its food-plant (*Passiflora*), is to be found. The butterfly flies low and rather slowly and alights but rarely. At Tagus Cove (Albemarle), it was quite plentiful during March and April, both in the valley and on the west slope of the high mountain which was comparatively dry even to its summit, 4000 feet above the sea. In a strip of vegetation at an altitude of 1500 feet where *Passiflora* was abundant, a few larvæ of this butterfly were seen. They were mostly in the final instar, and from them, I succeeded in rearing but one butterfly, the other larvæ perishing before pupation.

The butterfly was observed perhaps most plentifully on the rounded summit of Charles Island (May and June). On this island, during the month of October, 1905, a female was observed ovipositing in the dry thickets, and this would suggest that the species passes the dry season in the egg state or as very young larvæ.[1] Occurs on Charles, Chatham, Indefatigable, Albemarle, James, Narborough, and Abingdon Islands. It may also occur at times, on some of the other islands.

Alar expanse: ♂ 45, 49, 49, 50, 52, 53, 54, 55, 57, 58, 60, 60=53.5 mm.

♀ 48, 52, 52, 54, 55, 55, 55, 56, 60, 61=54.8 mm.

22 specimens. Plate XX, figs. 1-2.

3. **Pyrameis huntera** Fabr., Syst. Ent., 499, 1775.

One fresh specimen, taken on the treeless summit of Villamil Mountain, 3000 feet altitude (Albemarle Island), August, 1906. The insect is typical and expands 52 mm. Several

[1] Collected on the Albatross Expedition in 1888 and 1891 (where it is referred to by A. Agassiz as *Argynnis*), the Hopkins-Stanford Expedition, and perhaps also on some of the earlier expeditions.

other rather worn examples were seen flying briskly about the summit, and one or two fresh specimens were observed in late March, 1906, on Tagus Cove Mountain, at an altitude of 3500 feet. At this locality, was found a species of *Gnaphalium* which was without doubt the larval food-plant of *huntera.*

4. **Pyrameis caryae** Hubner, Samml. ex. Schmett., I, 1806.
One flown example taken at Wreck Bay, Chatham Island, January, 1906. Does not differ from Californian specimens. Several species of *Urticaceæ* and *Malvaceæ* occur in the Galapagos, and on one or more of these the larva must feed.

LYCAENIDAE

5. **Cupido parrhasioides** Wallengren (Lyc. par.). Wein. Ent. Mon. IV, p. 37, No. 15, 1860. Eug. Resa. p. 355 (1861).

This pretty "blue" was described from specimens taken on the voyage of the Swedish frigate "Eugenie," in 1852.

Wallengren's description is as follows[1] (p. 355) 10. *Lycaena parrhasioides*:

"Alis ecanudatis, infra canescentibus lineis albis duplicatis subundulatis, posticarum irregularibus; posticis ocellis 3-4 analibus, nigris coeruleo-foetis; oculis hirtis.

Mas: Alis supra violaceo-caerulescentibus, posticis punctis 2-3 analibus nigris, sub-obsoletis.

Femina: Alis supra fuscis, ad basin plus minus coerulea-pulverulentibus; anticis macula discoidali fusca, obsoleta; posticis punctis 4 analibus nigris, antice coeruleo-limbatis.

Patria: Puna mense Martii. Iusula St. Joseph mense Aprilis; ins. Galapagos mense Maji.

L. parrhasio, God. affinis videtur; *L. optileti* magnitudine æqualis, sed interdum *L. also* haud major. §*Mas:* Alæ supra violaceo-coeruleæ, margine exteriore tenuissime infuscato; posticæ puncta 2-3 analia nigra gerunt. Alæ omnes infra canescentes; anticæ per discum lineas subundulatas, transversas 6 albas, per paria sitas, quarum par externum postice abbreviatum, gerunt; alæ posticae etiam lineas ejusmodi ostendunt, sed par intermedium saepissime bis interruptum, et externum tantum inter costas 2-6 locum tenet, et cum pari intermedio ad finem tam antice tam postice cohærit. Ad basin alarum posticarum linea albo unica se præbit. Ad marginem exteriorem alarum omnium circuli oblongi et intra illos anguli confluentes albi locum tenet. Circuli 3-4 alarum posticarum anales sunt in medio nigri cæruleo-fœti, ocelliformes. A basi alarum anticarum usque ad medium, prope marginem anticum, striga fusca, postice albo-marginata, locum tenet. Interstitia inter lineas transversa alarum anticarum fundo obscuriora. §*Femina* mari infra similis, supra fusca, et ad finem cellulæ alarum anticarum maculam transversam, fuscam, obsoletam gerit. Alæ ejus omnes sunt supra ad basin cæruleo-pubverulentes et posticæ puncta analia 4 nigra, antice cæruleo-limbata, gerunt."

[1] Furnished me through Dr. Henry Skinner.

The above states that the wings are without tails, below grayish with subundulate, double, white lines, those of the secondaries irregular; secondaries with three to four black anal spots full of blue; eyes hairy.

Male: Wings above violet bluish, the secondaries with from two to three black anal spots, which are sub-obscure.

Female: Wings fuscuous above, more or less powdered with blue towards the base, the primaries with the fuscous discoidal spot obscure, secondaries with four black anal spots, bordered anteriorly with blue.

Habitat Puna (March), the island of St. Joseph[1] (April), Galapagos Islands (May).

Related to *L. parrhasio* God. It is equal in size to *L. Optileti,* but now and then it is not larger than *L. Also.*

Male: Wings above violet blue, exterior margin very narrowly infuscated. Secondaries bear two to three black anal points. All the wings beneath are grayish. The primaries are traversed by six white subundulate lines arranged in pairs, the external pair of which is shortened posteriorly; secondaries also have lines of this kind, but the intermediate pair is very often twice interrupted, and the external pair only occupies the space between veins 2-6, and is joined together with the intermediate pair at the end anteriorly as well as posteriorly. There is a single white line at the base of the secondaries. There are oblong circles along the exterior margin of all the wings and within these the space is occupied by confluent white angles. Three to four of the anal circles of the secondaries are ocelliforme, black in the middle, and full of blue. There is a fuscous streak edged posteriorly with white, extending from the base of the primaries up to the middle field, near the front margin. Spaces between the transverse lines of the primaries more obscure at the base.

Female: Similar to the male beneath; above, fuscous, with an obscure transverse, fuscous spot at the end of the cell of the primaries. Above, all the wings of the ♀ are powdered with blue at the base, and the secondaries have four black anal points edged anteriorly with blue.

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[1] This must be S. José I., one of the Pearl Islands, in the Bay of Panama.

This species, according to Wallengren, is related to *L. parrhasius* of Java. Its nearest ally and perhaps the one from which it was derived, is probably Lyc. *marina* of America, from which it can be separated by its somewhat smaller size and darker shade, and by the possession on the under side of the secondaries of three (with traces of one or two more) distinct velvety black spots ringed by metallic blue and then by orange, whereas *marina* has but two such spots. The second spot from the anal angle is the largest. The undulating white lines of the wings beneath are finer than in *marina*.

C. parrhasioides is common in the Galapagos, where it was found on Charles, Chatham, Albemarle, Narborough, James, Hood, and Duncan Islands. It seems to be more restricted to the arid district than are the other butterflies, and occurs commonly where its food plant, *Cardiospermum corindum* and perhaps *C. galapageium* (*Sapindaceæ*) is found.

Near the shore at Cape Rose (Albemarle Island), in March, 1906, the little butterfly was plentiful in the vast field of jagged black lava which supported a somewhat scant vegetation—*Croton, Bursera, Opuntia, Cereus,* etc., and its vine-like food plant. The butterfly was here observed to oviposit on the young leaves of this plant. At the lower levels, about James Bay (James Island), *parrhasioides* was abundant where *Cardiospermum* flourished, which was especially on lava. The butterflies were at this season (August, 1906), in a generally faded condition, and the egg shells of the species were plentiful on *Cardiospermum,* then in leaf.

As the imagines were fresh and common at a much earlier date than August, we may infer therefrom that *parrhasioides* is double-brooded, the February-March specimens emerging from pupæ formed in about September of the preceding year; or perhaps that the insect passes the dry season as an egg or small caterpillar.

A female *parrhasioides* from Iguana Cove, Albemarle, is aberrant in having the undulating white lines beneath diffusing and disappearing.

The insect was also taken on the voyage of the "Eugenie"; by A. Agassiz in 1891; and by Snodgrass and Heller of the Hopkins-Stanford Expedition. Its occurrence on Puna Island in the Gulf of Guayaquil (Ecuador), and on St. Joseph Island in the Bay of Panama, is interesting and suggestive. *Sphingonotus fusco-irroratus* (Orthoptera), is also reported from Puna as well as the Galapagos Islands.

25 specimens, including one ♂ sent to Dr. Henry Skinner for his opinion on the species.

♂ 20, 20, 20, 22, 22, 23, 23, 25, 25, 25, 26, 26, 26, 28 mm. =23.6 mm.

♀ 18, 21, 22, 23, 23, 24, 24, 24, 24, 25 mm.=22.8 mm. Plate XX, figs. 3-5.

HESPERIDAE

6. **Eudamus galapagensis** n. sp.

Male: Head brownish, with some yellowish-white scales which predominate ventrad; Antennæ strongly hooked, dark smoky brown, indistinctly annulate with white towards the base, hook of antennæ tawny below; labial palpi with distal joint dark brown; thorax greenish olive with long hairs; abdomen blackish with purple tinge and with pale yellowish or yellowish-green scales, numerous ventrad and along the edge of the segments. Legs brownish with purple reflections, and with long hairs of lighter color. Length of body 16 mm. *Above,*—Wings dark brown with a slight greenish-olive gloss and enclosing the small yellowish-white diaphanous spots arranged as follows: three small ones before apex, *i. e.,* one subquadrate at base of and on each side of Sc.$_4$, the third which is subtriangular, at base of SC$_5$, and beyond the others; two small rather elongate ones, one on either side of the costal vein and situated at about the middle of the wing. Immediately below these two is a larger spot in the middle of the discal cell. Outwardly below in cell M_2 is a still larger subrectangular spot. This is the largest spot. In the outer third of cell M_1 is a square spot not extending half way down to the submedian nervure. Inside the middle of cell M_3 is a large rectangular spot exteriorly sinuate. The three spots before the apex and those in cells M_1 &$_3$ are in line. Fringes pale brown, brownish black from nervures. A fine double, blackish brown line on edge of wings. Secondaries without spots; with a short slightly curved and tapering tail of a blackish brown color, its basal hairs long and greenish. Under a lens, the nervures are largely metallic purple.

Below—The spots are repeated on the primaries. A rather obscure lilac marginal band, becoming obsolete at anal angle; a lilac patch with some pale blue scales from the end of discal cell and in the discocellular area. No markings on space overlapped by secondaries. Secondaries blackish brown, with a basal, mesal, extradiscal and marginal band of lilac, tinted with pale bluish scales, these bands reducing the ground to two somewhat narrower bands and a spot near the base of the wing. The extra-discal (=submarginal) lilac band is curved, especially where it disappears at the tail where it becomes almost whitish. There are a number of pale straw yellow scales on the secondaries, fewer on the primaries. Expanse 43 mm., length of tails (exterior measurement) 6.25 mm.

Female: Like the male, but with broader tails, 5 mm. long and about straight, no costal fold on primaries, expanse—46 mm. (Tagus Cove, March-April, 1906).

In some specimens, the diaphanous spots are smaller and the lilac bands on the underside tend more to a pale bluish or lavender, or rarely are replaced by lighter brown or yellowish scales. The insect much resembles *E. santiago* but is not quite so dark as that species and the spots, similarly disposed, are usually larger. Below, the pattern agrees rather closely with that of *santiago,* but the latter replaces the lilac of *galapagensis* with purplish. The purplish and pale scales are in smaller proportion in *santiago* and the tails of the latter are longer.

Type 1 ♂ (Chatham Island 700 ft. altitude, October 15, 1905), and 1 ♀ Tagus Cove, March-April, 1906, Galapagos, in possession of the California Academy of Sciences. Cotypes, 1, Phil. Acad. Sci.; 10, Cal. Acad. Sciences.

One pupa of this butterfly found lying exposed on the ground at Banks Bay, Albemarle Island, in April, 1906. Pupa: Of the usual stout *Eudamus* form; rugose under a lens, pale brown speckled with darker brown, a brown stripe above the spiracles. Head very nearly as wide as thorax, not very convex on vertex giving it a square aspect. Cremaster darker brown, rounded at extremity, excavate ventrad. Length 16 mm., width at shoulders 5 mm. Pupa preserved in spirits.

This is a common Skipper, especially on Chatham and Albemarle Islands, appearing quite early in the season, being rather distinctly double-brooded, the first flight beginning in January or thereabouts, while the butterfly again makes its appearance in the dry season, in about August. Seasonal conditions often vary somewhat on different islands and different slopes of the group, and this makes it rather difficult to determine the number and time of appearance of the insects there. The seasons then are not strictly contemporaneous in the Archipelago. During April, 1906, the skipper was fairly abundant at Bank's Bay (Albemarle), and half- to full-grown larvæ were found feeding on a trifoliate leguminous annual; the larvæ making a sort of nest for themselves with the leaves after the manner of other members of the genus. The butterfly has a swift flight, and when it occurs in the dry and almost barren lava beds (as it frequently does), it likes to alight in the shade of some projecting piece of rock. Such localities, were parts of South Albemarle Island and Cowley Mountain, on the same island.

E. galapagensis was also secured on the Albatross Expedition in 1888, but in too poor condition to be described; it is also reported by A. Agassiz. There are ten specimens in good and fair condition in the U. S. National Museum, labeled Hood, Chatham, and Duncan Islands, Galapagos, 1891, and a series was also taken on the Hopkins-Stanford Expedition in 1898-9. It is not improbable that other expeditions also secured it.

Thirteen specimens were taken on the California Academy of Sciences Expedition, one of these being in possession of Dr. H. Skinner to whom it was referred. The specimens are from Chatham, Albemarle, and Charles Islands, others seen but not taken on James, Indefatigable, and Duncan Islands.

Expanse: ♂ 37, 38, 40, 40, 41, 43, 43=40.3 mm.
♀ 42, 45, 46, 47, 48=45.6 mm. Plate XX, fig. 6.

HETEROCERA

SPHINGIDAE

The following are the Hawk-Moths known to occur in the Galapagos Archipelago:

Triptogon lugubris Linn.
Deilephila lineata Fabr.
Theretra tersa Linn.
Dilophonota ello Linn.
Dilophonota obscura Fabr. var. *conformis* Roth. and Jordan.
Phlegathontius rustica Fabr. form *calapagensis* Holland.
Phlegathontius rustica Fabr. var. *nigrita* Roth. and Jordan.
Phlegathontius leucoptera Roth. and Jordan.
Phlegathontius cingulata Fabr.

1. **Triptogon lugubris** Linnæus, Mant. Plant 537, 1771.

The specimens are somewhat smaller than the continental examples with which I have compared them, otherwise they cannot be said to differ from the latter.

Abbot and Smith's description of the mature larvæ of this insect, as quoted by Morris in his "Synopsis of the Described Lepidoptera of North America" reads: "Head dark green, with a yellow frontal band. Body pale green, with vascular dark green dashes, and a dark green subdorsal line bordered beneath with whitish; nine short lateral, pale yellow bands; horn dark green; stigmata reddish." This description answers well for the ordinary form, but many of the Galapagos specimens (and probably from elsewhere as well) are blotched obliquely with chocolate brown from the subdorsal line laterad, from segments 6-10 inclusive. The thorax, a part of segment 5, and segments 10 and 11, have also patches of the same color.

Larvæ were observed in several instars at Iguana Cove, Albemarle Islands, March 17-21, 1906, feeding upon *Cissus sicyoides,* one of the *Vitaceæ* which flourished in that locality. The pupa is rather dark reddish brown, with the head-case obtusely rounded, and the cremaster quite stout. By digging in the loose mouldy soil near some rocky barrier, a living pupa and several pupa shells of *lugubris* were obtained.

The moths were observed on the wing, at Iguana Cove, in March, 1909, as flown specimens, the second brood coming out in April and May, the pupal period for this brood evidently being of short duration.

The insect is rather partial to the more tropically-clothed portions of the islands, as the "Green Zone" of the mountains, and those littoral areas where fairly fresh water stands and which harbor a somewhat luxurious vegetation, including its food plant.

Triptogon lugubris was observed most plentifully at Iguana Cove, whence it was found to extend along the coast to Villamil, thirty miles to the west. At the latter place, several specimens were taken at the flowers of *Cordia lutea* in the bright sunshine, where they were comparatively slow in their flight. However, high up on the dreary rain-sodden and vine-covered slopes of South Indefatigable Island, this little sphinx might be seen now and then flying with great speed and with a loud humming noise over the subtropical vegetation, pausing but rarely to plunge out of sight into a large convolvalaceous flower, but before you can scramble to it net in hand, it is skimming far up the mountain side. During April and May, the moth was several times observed flying low over the sandy shores below Villamil settlement, Albemarle Island, and darting out to sea, being also seen from the schooner "Academy" which was at anchor over a mile from shore.

Lugubris was observed on the higher portions of Indefatigable Island (November, 1905), Albemarle (March, April and May, 1906), while an old pupal shell which seemed referable to this species, was found high up on Charles Island (June, 1906). It is a common insect in the American tropics.

There is some variation in color among the ten examples taken, the scallops of the wings seem deeper than in some specimens from Florida with which I compared them.

Galapagos—Alar expanse. ♂ 49, 53, 63 mm.=55 mm.
♀ 53, 53, 58, 60, 60, 60, 63 mm.=58.1 mm.

Florida—Alar expanse. ♂ 60, 62, 62 mm.=61.3 mm.
♀ 72, 78, 79 mm.=76.3 mm.

The three smallest ♀♀ from the Galapagos were reared, which probably accounts for their size. There are several larvæ and one pupa preserved in spirits.

2. **Deilephila lineata** Fabricius, Syst. Ent., 541, 1775.

The "White-lined" Sphinx, which is by no means the commonest of the Hawk-moths of the islands, has heretofore been collected in the Galapagos, by the Albatross Expedition (1887-88), which secured one male from Charles Island. Of the five specimens secured by me in 1906, three were reared from larvæ; and the series when compared with *lineata* from Shasta county, California, averages considerably smaller in size.

Lineata larvæ were found at Wreck Bay, Chatham Island (February 20, 1906), where the two-color forms were observed; on Charles Island in early March, as less advanced in growth than on the preceding island; and at Tagus Cove, Albemarle Island, in late March, when many of the caterpillars had already pupated.

Adults were observed in March (Charles Island), and at Villamil (Albemarle Island), in early May, and in both cases, in the early afternoon. The insect is certainly double-brooded and probably triple-brooded in the Galapagos; a small per cent of the late insects probably passing the dry season as pupæ.

Distribution: Charles, Chatham, and Albemarle Islands, and probably elsewhere in the Archipelago. It occurs also in the Hawaiian Islands, and is the best known North American

Hawk-moth. Also reported by Holland, and Rothschild and Jordan, from the Galapagos Islands.

There are several larvæ and one pupa of *lineata,* from the Galapagos, preserved in spirits.

Galapagos—Alar expanse. ♂ 51,[1] 67 mm.=59 mm.

♀ 62, 67,[1] 78[1] mm.=69 mm.

California, U. S.—Alar expanse. ♂ 77, 78, 79, 88 mm.= 80.5 mm.

♀ 90, 96, 98, 101 mm.=96.2 mm.

3. **Theretra tersa** Linnæus, Mant. Plant., II, 538, 1771.

This handsome insect appears to be still rare in the islands, the only specimen secured being reared from a larva discovered by lamplight, feeding upon the leaves of *Clerodendron molle,* Chatham Island, February 23, 1906.

The larva of *tersa,* which is of the "Hog" caterpillar type, has several times been described, while the pupa corresponds well to Hy. Edwards' description of it in Entomologica Americana, III, 164, 1887. The pupa was formed in a shallow depression in the soil, and sheltered by a leaf or two.

This sphinx may be a recent arrival to the Galapagos Archipelago, judging from its rarity there, and from the fact that it was taken only from the most windward (except Hood Island) island of the group, viz., Chatham. It does not differ from continental specimens, which are quite common in the Tropics.

One Male—Wreck Bay, Chatham Island, altitude 500 feet, February 23, 1906.

Alar expanse, 66 mm.

4. **Dilophonota ello** Linnæus, Syst. Nat., 491, 1758.

This species was found quite plentifully on Charles, Chatham, and Albemarle Islands.

Imagines were taken at flowers on the three above-named islands, during the rainy season. The first larva taken, was found at the base of a Guava tree (*Psidium*), on Chatham Island, January, 1906. It pupated a short time after its capture. Small specimens of the larvæ were observed at South Albemarle, in early March, 1906, and in numbers at Iguana Cove, a few days later. The food plant of *ello* is *Hippomane*

[1] Ex larva.

mancinella (a poisonous tree, which is common along the shores), and *Psidium*. At Iguana Cove, the larvæ were observed in several instars and were either of a pale sea-green or reddish-brown color, as described by Edwards, Holland, and others. The larva has a habit of stretching itself appressed to a twig, and is thus often difficult of detection. The pupa has been well described by Edwards (Ent. Americana, III, 167, 1887), and a number of these prettily striped objects were found beneath *Hippomane* trees (Iguana Cove), by disturbing the loose mouldy soil and by overturning pieces of lava.

D. ello is an exceedingly abundant insect in the American tropics and occasionally ventures well up into the temperate latitudes of North America. It is also recorded from the Galapagos Islands by Rothschild and Jordan.

There are nine ♂ and eight ♀ in the Academy's collection, besides three pupæ and several larvæ preserved in spirits.

Alar expanse: ♂ 67, 70, 71, 72, 72, 73, 73, 74, 78=7.22 mm.

♀ 72, 72, 74, 76, 78, 79, 82, 91=78 mm.

5. **Dilophonota obscura** Fabricius, Syst. Ent., 538, 1775.

Subsp. *conformis*, Rothschild and Jordan, Novitates Zoologicæ, Supplement Vol. IX,[1] 369, 1903.

The description of the insect in Novitates Zoologicæ, reads:

"Erynnis obscura conformis, subsp. Nov. ♂ ♀. Sexes similar; ♂ without a longitudinal streak on the forewing, and having the thorax as gray as ♀. Distal margin of hindwing rather darker in the upper half than in the ordinary form, and the post-discal line of dots more distinct. *Hab.* Galapagos Island, Albemarle; end of March to May, 1902 (Beck); *type:* Top of crater, S. E. Albemarle, 27, III, 1902. In the Tring Museum 4 ♂ ♂, 4 ♀ ♀."

There are 4 ♂ ♂ and 32 ♀ ♀ in the collection of the California Academy of Sciences, and there is but one ♀ among these which has the thorax as dark as in the ♂ ♂. These have the thorax slightly darker than in the ♀. The thorax of the latter sex, is nearly concolorous gray, while in the ♂, several longitudinal lines of brownish gray are evident, which are almost or entirely absent in the ♀ ♀. Quite a common insect in the Tagus Cove region, Albemarle Island, in March and April. It was easily attracted by light and a number were taken throughout the night, at a campfire, on the mountain slope.

There were but few larvæ of this species to be found by the end of March, but the evidence of their ravages was discernible on their food plant, a species of Asclepiad vine (*Asclepias angustissima*), which was abundant at Tagus Cove, especially on lava. As in *D. ello*, there are two color forms of the larva, one being purplish gray, the other pale green. There is no pink spot on the third and fourth segments as in *D. ello*, and the anal horn is quite short.

The insect has been taken only on Albemarle Island.

Alar expanse: ♂ 56, 59, 60, 62=59.25 mm.

♀ 54, 57, 58, 58, 59, 60, 60, 60, 60, 60, 60, 60, 60, 61, 61, 62, 62, 62, 62, 62, 62, 62, 62, 63, 63, 63, 63, 64, 64, 65, 66= 61.12 mm. Plate XX, fig. 11.

6. **Phlegathontius rustica** Fabricius, Syst. Ent., 540, 1775; var. *calapagensis* Holland, Proc. U. S. N. M., XII, 195, 1889 (Galapagos, Charles Island).

Syzygia galapagensis Kirby, Cat. Lep. Het. I, p. 685, No. 2, 1892 (Galapagos).

Protoparce calapagensis Rothschild and Jordan, Novitates Zoologicæ, Suppl. Vol. IX,[1] 85, 1903 (Charles and Chatham Islands, Galapagos).

This common Galapagos Sphinx was first described by Holland, from one ♀ secured on the Albatross Expedition, in 1889. He thinks it entitled to specific rank, but Rothschild and Jordan in their great work on the Sphingidæ of the world, consider *calapagensis* a subspecies of *rustica*.

Holland's description of *calapagensis* reads:

"*Protoparce calapagensis* sp. nov. (Holland). Upper surface—Anterior wings white, traversed by double, undulate, black transverse anterior, posterior, and submarginal lines, the latter terminating near the exterior angle in a conspicuous black spot. A row of marginal black spots, those nearest the apex protracted in the form of dashes; the second from the apex coalescing with the submarginal line, further ornaments the wing. Fringes white, interrupted at the end of the nervures by black. The discal dot is pure white, large, narrowly margined with black. Upon the costa, near the base, is a black dash, followed by some confused "pepper and salt" markings near the transverse anterior line. Posterior wings gray, shading into white at anal angle, and traversed by three black bands, of which the two on the discal space are narrow, while the submarginal band is broader, widening rapidly from the anal angle toward the anterior margin. Head, antennæ, and thorax white. Patagiæ white, marked in the middle with a deep black curved line extending from the insertion of the anterior wings about two-thirds of their length. Abdomen light gray, almost white, ornamented by two large tufts of black hair at base, and by a narrow dorsal line consisting of a black dash upon each segment. Each segment is further margined by a transverse line of black at its insertion, and the second, third, and fourth are marked by lateral spots of pale yellow surrounded with black.

Under Surface—Palpi, thorax, and abdomen snowy white. Upper ends of tibiæ and tarsi light brown, ringed with white. Wings gray, obscurely marked, and banded as on upper surface. Expanse of wings, 90 mm.

Described from one female specimen in fair condition, labeled 'Galapagos, Charles Island.'"

Rothschild and Jordan's description:

"♂ ♀ smaller and paler than *Rustica rustica.* The tenth abdominal tergite of the ♂ not so distinctly sinuate, and harpe shorter than in *Rustica rustica,* otherwise the same. In Tring Museum 2 ♂♂, 2 ♀♀, Chatham Island, 14, III, 1901 (R. H. Beck); Charles Island (Markham)."

The insect is quite variable, the female described by Holland, is evidently a pale specimen, while the sphinx referred to by him as being "too badly worn to permit of a proper description," may belong here. While some of the specimens in the California Academy of Sciences' collection, approach the var. *nigrita* R. & J. quite closely, they can be separated from it by the constant presence of the ochraceous coloration, and usually by the conspicuous yellow abdominal spots which are wanting in *nigrita.* A male *calapagensis* from Charles Island, is very heavily marked with ochraceous; in several other specimens, this color is scarcely observable; while in the duskiest individuals, the yellow abdominal spots are almost obsolete.

Mature larva—Head pale green, body paler green, roughly granulated, the granules yellowish white and most prominent on the thorax, where they are arranged in a subdorsal row with more or less scattered granules between. Seven oblique stripes of purple lake, below which are cream colored stripes; stigmata with yellow discs. Tarsi black, with one or two pale yellow granules basally; anal horn stout and curved, yellowish, roughened with tubercles. Approximate length 70 mm. Described from several well preserved alcoholic specimens.

Considerable color variation exists among these larvæ; some of them have a yellowish ground color, others are adorned with large purplish patches, while fewer are blackish purple, the head being purplish with green about the clypeus. In all cases, the granules are conspicuous and of a pale yellowish color.

The larva of typical *rustica,* differs somewhat from that of the island form, as can be seen from the following description of *rustica rustica* by Rothschild and Jordan: "Larva finely granulated, with seven side-bands, which are white and bordered green in front." The larva illustrated by Smyth in Ent. News, XI, 486, 1900, resembles much more another rarer form of larva taken, which is nearly smooth, and may or may not belong to this species, and which is described later.

The pupa is reddish brown, with a short detached tongue-case applied to the breast by its pear-shaped extremity. The tongue-case is roughened subdorsally by sharp transverse ridges. Length 50 mm.

Larva and adults of *P. rustica calapagensis* were observed at Chatham in February, 1906, the latter being rather worn, and the former in several instars, but scarcely mature (February 23, 1906). A few days later, on Charles Island, eggs and adults were secured. The height of the larva season, is March and early April, when they were to be found in numbers, at Iguana and Tagus Coves, Albemarle Island. At the latter cove, they were found up to an altitude of 3000 feet, but were commoner at lower levels, where *Cordia lutea,* one of the *Borraginaceæ* abounded. This is the most popular of its food plants, while *Clerodendron molle* (Verbenaceæ) appeared to replace it as a food-plant, on Charles and Chatham; and in some localities on Albemarle, the large arboreal Heliotrope, *Tournefortia rufo-sericea,* was preferred. That the caterpillar is not particular as regards its food-plant, may be further inferred from the fact that it was also found feeding on *Erigeron lancifolius,* one of the *Compositæ, Croton scouleri* var. *Macræi,* and *Bastardia viscosa* (Malvaceæ). The larva of *rustica calapagensis* was found to be more frequently parasitized than those of the other *Sphingidæ.*

Pupation took place in March and April, especially in the latter month, when pupæ could be readily obtained at Tagus Cove, by digging among the roots of *Cordia lutea.* The adults emerge two or three weeks after pupation, though a small proportion seem to remain in the pupal stage until the next rainy season. The moths were plentiful at dusk, at the flowers of *Cordia lutea, Clerodendron molle,* etc., and were not difficult to net. It is widely distributed in the Archipelago as is the case with its favorite food-plant. An old pupal shell, found on the ground, among the dry leaves of *Cordia,* on Tower Island, undoubtedly belonged to this species. (About September 15, 1906.) This insect was taken on the Albatross Expedition (1889), from Charles Island. There are two males and two females in the Tring Museum, England, and taken by R. H. Beck 3-14-1901. Snodgrass and Heller took it on Hood and Albemarle (Hopkins-Stanford Galapagos Expedition). There are nine males and five females in the Academy's collection. Taken on Charles, Chatham, and Albemarle Islands.

Alar expanse: ♂ 74, 82, 84, 85, 88, 89, 89, 90, 92=85.88 mm.

♀ 82, 92, 98, 102, 103=95.4 mm. Plate XX, fig. 8-9.

6a. **Phlegathontius calapagensis** Holland.

Aberration *nigrita,* Rothschild and Jordan, Novitates Zoologicæ, Suppl., Vol. IX,[1] 85, 1903.

This dark form is thus described by Rothschild and Jordan:

"A ♂ from Chatham Island in the Tring Museum is abnormal, having the body above and the wings nearly entirely brownish black, except the double series of dorsal dots on the abdomen, the stigma of the forewing and the marginal spots of both wings, which are white, besides feeble traces of white markings on both wings. The first segment of the palpus is much less extended white than in normal specimens. We call this aberrant individual—ab. nigrita nov."

I obtained ex larvæ, three ♀♀ and one ♂ of *nigrita* at Tagus Cove, Albemarle Island, end of April, 1906. These four specimens have no yellowish patches but three dirty white ones instead, the first two in the largest ♀, have a shade of brownish yellow however. The double row of abdominal white dots are more or less connected by interspersed white scales.

This form appears to be quite rare, but its presence would seem to indicate that the variable *P. calapagensis* may resolve itself into two or more species in the distant future.

Alar expanse: ♂ 82 mm.

♀ 80, 88, 100=89.33 mm.

A sphinx larva evidently that of a *Phlegathontius,* and probably belonging to *calapagensis* but differing remarkably from and rarer than the usual form of that larva, was taken by me at Tagus Cove. The fact that this form confined itself almost entirely to devouring the leaves of *Erigeron lancifolius* (a few being also found feeding on *Croton Scouleri*), is significant. The larvæ were most plentiful from 1500 to 2000 feet elevation and were not found below 600 feet, at Tagus Cove. Their range is apparently controlled by *Erigeron.*

The following is a description of the larva:

Mature larva—Smooth; head rather rugose with scant pile, color apple green, with a basal stripe of paris green and an anterior stripe of olive green with brown; clypeus, the same color as latter stripe; ocelli green, in a brown blotch. Body stouter than in *P. rustica calapagensis,* dark green with seven oblique prune purple stripes, each with a streak of emerald green above and one of creamy yellow below, the latter bordered by duller prune purple merging into dark green and duller purple. Dorsum creamy yellow, median line green; anal flap, dark olive encircled with Paris green; anal horn stout and curved, ochre yellow, roughened with small dark tubercles. On segment 1 are two irregular rows of dorsal tubercles, in a field of dark green. Description based on several alcoholic specimens, in poor condition, and on field notes.

Judging from the description and illustration of *P. rustica rustica,* by E. E. Smyth (Ent. News, XI, p. 486, 1900), the above described insect corresponds much more to it than does the usual plainer and rough form of *calapagensis.* From this, one might be tempted to infer that the smooth form of larva is the more ancient one which is being replaced by the more omnivorous rough form. Unfortunately these two forms were not kept separate and both *calapagensis* and its aberration *nigrita* were produced from this lot. Plate XX, fig. 10.

7. **Phlegathontius leucoptera** Rothschild and Jordan, Novitates Zoologicæ, Supplement Vol. IX[1], p. 79, and 805, 1903, figure Vol. IX,[2] plate XI, fig. 2, ♀.

The description reads:

"*Protoparce leucoptera* spec. nov. (Pl. XI f. 2, ♀) ♀ Antenna very slender, faintly incrassate distally, scaling white. Body whitish grey, mixed with brown, sides of palpus near eye, a dorso-lateral patch on metanotum and first abdominal segment, bases of apical edges of abdominal tergites on sides, brown; white dorso-lateral dots of abdomen widely separate (not distinct in our unique individual); five large yellow side-patches to abdomen, gradually decreasing in diameter, a trace of a sixth spot on seventh segment; posterior ventral angles of tergites white; abdomen below with traces of brown mesial spots. First segment of protarsus about as long as segments 2 and 3 together, with a few short spines at base, and three long ones, situated at base, in middle and at end respectively. No pulvillus. Wings, *upperside*—Forewing: greyish white; a white stigma; submarginal area shaded with brown; a brown post-discal undulate line, an oblique black apical line, and rather indistinct brown submarginal halfmoons; fringe not well preserved, apparently the white spots smaller than the brown portions. Hindwing: grey, shaded with brown, marginal area brown, a blackish, irregular, postdiscal band; between it and base four indistinct bands or lines, the most proximal broadest, situated between base and M_2. *Underside* drab grey—Forewing: disc slightly paler; grey marginal spots; a thin oblique brown apical line; scaling in front of this line grey; scattered grey scaling also along outer margin. Hindwing: paler grey, especially a broad ill-defined discal band-like space and abdominal area; distal marginal area brown, especially in submarginal area; a faint brown band between this border and cell. Length of forewing: ♀, 45 mm.

Hab. Chatham Island, Galapagos Islands, 14, III, '01 (Beck). Allied to *petuniæ* and *sexta.* The dorsum of the thorax is mutilated in the specimen."

Further description in the appendix of the same volume reads:

"Two ♀♀ from S. E. Albemarle, collected by Mr. Beck on March 26th and 27th, 1902, are rather better preserved than the specimen described and figured. The forewing bears the antemedian lines of the allied species, and three dentate discal ones, besides the postdiscal one. On the underside there are two discal lines on the hindwing, and one or two on the forewing."

I secured ex larva, two ♂♂ and three ♀♀, one ♀ being from Chatham Island, March, '06, and the remaining specimens from Tagus Cove, Albemarle Island, April 29-30, 1906. These specimens have the dorso-lateral patch on metanotum and first abdominal segment almost black, and the former patch is interspersed with pale yellow hairs in its inner corner.

Larva—Smooth, moderately stout; head somewhat rugose, rounded, about 5.5 mm. wide; segments of body with about eight transverse deeply incised folds or wrinkles. Body, pale green, with seven oblique blackish dashes running above into the furrows, bordered below by a yellow dash. Thorax, nearly plain concolorous green, feet, circled with black. A thin dorsal line and transverse streaks in the folds form a rough triangle on each segment from four to ten inclusive. Spiracles large, dusky. There is much blackish at base of legs and on segments four and five, and suggesting pen scratches. No blackish about anal claspers; horn slender curved and pointed, reddish, and somewhat roughened by small tubercles. Length 66 mm., width about 9 mm. Described from two nearly mature, rather poorly preserved alcoholic specimens, Wreck Bay, Chatham Island, February, 1906.

Pupa of the usual form, light reddish brown, the short ridged tongue-case applied in a curve to breast, length 40 mm. The specimen is undersized.

This pale colored *Sphinx* appears to be the rarest of the genus, no adults being taken at flowers, and the larvæ were rather local and were found feeding on a low, succulent Solanaceous plant at low altitude, at Wreck Bay, Chatham Island (February); Iguana Cove, Albemarle Island (March), and Tagus Cove, April 30, 1906.

Alar expanse: ♂ 90, 93 mm.=91.5 mm.

♀ 74, 94, 98 mm.=88.7 mm. Plate XX, fig. 7.

8. **Phlegathontius cingulata** Fabricius Syst. Ent., 545, 1775. *Protoparce cingulata,* Holland, Proc. U. S. N. M., XII, 195, 1889 ("Galapagos, Chatham Island"). *Herse cingulata,* Rothschild and Jordan, Novitates Zoologicæ, Suppl. Vol. IX[1], p. 10 & 11, 1903 (Galapagos).

The "Pink-spotted" Hawk-moth is by far the commonest and perhaps the most widely distributed sphinx in the Archipelago, having been taken by several of the previous expeditions to these islands.

In common with several of the other Galapagos hawk-moths, *cingulata* is often seen in the daytime at flowers, and in the evening it may be taken in numbers. It flies rather sparsely before sunrise.

The Convolvulaceæ, upon which the larva of this moth feeds, are common plants in the Archipelago, and of several species, among which are *Ipomœa galapagensis, pes-capræ,* and *campanulata.* The larvæ present a considerable number of varieties reducible to two types, those of a green and those of a brown ground color. These two types have several vars. and intergradations. A common form is dark chocolate brown, with two dorsal stripes of straw color, and a creamy white super- and substigmatal stripe, the lower connected with the upper by eight oblique stripes of the same color, widened basally and frequently broken. The stigmata, bordered by dark brown, are contained in the base of the oblique stripes. A number of larval varieties are described by J. A. Lintner (Proc. Ent. Soc. Phil., Vol. III, pp. 650-651, 1864).

These monstrous caterpillars occurred in great numbers on Chatham Island, in February, 1906, when the roadside in the vicinity of Wreck Bay was swarming with them. They were also plentiful at Iguana Cove, Albemarle Island, in March.

The pupa, as is well known, is remarkable for its very long recurved tongue-case.

The moths do not differ from those of the mainland, but a few of the bred specimens, perhaps owing to under-feeding, are quite small and lack much of the usual rosy tinge.

P. cingulata is usually considered distinct from *convolvuli* of the Old World, but like it enjoys a wide range, being very common in the American tropics and occurring also in the Hawaiian Islands. A specimen of this insect was taken by Mr. S. J. Hunter of the Expedition on Cocos Island, September, 1905.

Specimens were found on Chatham, Albemarle, and Indefatigable Islands, and it doubtless occurs on most of the other islands of the group.

Taken also on the Albatross Expedition in 1889, the Hopkins-Stanford Expedition (the specimens being in Stanford University); and also by Mr. Beck in 1901.

There are ten ♂ ♂ and thirteen ♀ ♀ from these islands, in the collection of the California Academy of Sciences.

Alar expanse: ♂ 81, 81, 82, 82, 84, 86, 88, 88, 94, 97=86.3 mm.

♀ 77, 78, 82, 87, 87, 92, 93, 93, 97, 103, 103, 105, 112=92.2 mm.

One ♀ specimen from Cocos Island=114 mm.

CONCLUDING REMARKS

The fauna under consideration is oceanic in its character; very few of the species are wholly tropical, but are also represented in the more temperate regions (where they occur as stragglers or as well established insects) by the identical species, or the one from which they were probably derived. That this fauna, inhabiting islands situated on the equator, is not typically tropical, is quite to be expected, since the climate of the Galapagos cannot be termed tropical but rather temperate; with much aridity, that would suggest the survival of the fittest, the immigration largely of migratory forms which *de natura* must be hardy, and the elimination of more delicate and fastidious species which were not perpetuated there owing to the climate, enemies, or lack of food-plant, for it is not improbable that some fragile species once reached the Galapagos Archipelago.

With the possible exception of the Lycænid, *Cupido parrhasioides,* the rest of the species treated here are strong fliers and hardy insects, and some, as *Callidryas eubule* and *Deilephila lineata,* are widely distributed and of migratory habits, *Phlegathontius cingulata* having been caught at sea 500 miles from the nearest land (Holland).

An island of continental origin, whose fauna has not been once obliterated by some catastrophe, would contain a comparatively large number of species, since in this case there would have been no water for the species to cross over, and barring a change of climate and a long period thereafter, the flora would remain about the same as that of the mainland from which it was separated, and at least a goodly number of the insects would persist, whereas we have seen that the insect fauna of the Galapagos is very scant. The mainland, whether we consider the Mexican, Isthmian, or South American region, is undoubtedly very rich in Lepidoptera, as compared with that order as represented in the Galapagos.

The inferior size of a number of the Galapagos Lepidoptera as compared with the same species on the mainland, suggests that the climate is largely responsible for this change; and the fact that in some cases they are subspecifically or specifically distinct from their progenitors, shows that at least some of the fauna is of considerable antiquity, and that migrations to these islands have not been frequent or often successful. Climate and environment and isolation seem to be responsible for the evolutionary changes.

The study of the fauna of oceanic islands is an excellent guide for the determination of hardy migratory forms. We find *Pyrameis huntera* also inhabiting the Hawaiian Islands; likewise the moths, *Deilephila lineata, Phlegathontius convolvuli* (*cingulata* Fabr.), *Agrotis ypsilon,* etc. The Hawaiian and Galapagos Islands are separated from each other by a vast expanse of ocean, yet they have some forms in common. There are only seven butterflies and seven hawk-moths known from the Hawaiian Islands, and this fauna is also comparatively meager in the Azores, Bermudas, Samoan, Friendly Islands, etc.

The almost ubiquitous *Anosia plexippus,* which is found on a number of the oceanic islands, does not yet occur in the Galapagos, although a Milkweed (*Asclepias angustissima,* Andersson), is plentiful on some of the islands.

Utehesia ornatrix (Arctiidæ), *Erebus odora* (whose food-plant, a large leguminous tree has probably been introduced), *Agrotis ypsilon, Meliopotis nigrescens* and *sinualis,* and species of *Prodenia* (Noctuidæ), are among the Galapagos insects which are familiar to many collectors in the United States and elsewhere.

Notwithstanding the fact that the flora and fauna of the Galapagos are fairly well known, there still remains an immense field for further investigation there, and the only manner in which a satisfying knowledge of the natural history of these interesting islands could be obtained, would be by residing in the Archipelago for several years, and studying the fauna in all its relations in a most thorough and systematic manner. This little paper does not claim therefore to be much more than an imperfect study of the subject; yet it is based, however, on rather ample field notes and observations by the writer himself.

Table Showing the Insect Seasons as Illustrated by Notes on Four Species of Butterflies, Galapagos Archipelago

Season	Island	BUTTERFLY			
		Callidryas eubule	Agraulis galapagensis	Leptotes parrhasioides	Eudamus galapagensis
Dec. 1–16	Duncan	Too early	Too early, remains on summit	Rare	
" 18–20	Jervis				
" 23–31	James (James Bay)	Moderate	Moderate	Rather rare	Few at high altitude
Jan. 1– 4	James (James Bay)	Moderate	Moderate	Rather rare	Few at high altitude
" 11–14	Indefatigable (South part)				
" 24–31	Chatham (Wreck Bay)				
Feb. 1– 6	Hood				
" 8–13	Chatham	Very common	Common and fresh	Common and fresh	Passing season
" 20–24	Chatham				
" 26–28	Charles				
March 1– 2	Charles				
" 5–15	Albemarle (South)	Common, mid-season	Common	Common, ovipositing	
" 17–21	Albemarle (Iguana Cove)	Common	Fairly common	Very common	Common
" 23–31	Albemarle (Tagus Cove)	Common and to summit	Quite common, esp. at 1500 ft.	Common	Common and fresh
April 1– 9	Albemarle (Tagus Cove)	Common and to summit	Quite common, esp. at 1500 ft.	Common	Common and fresh
" 10–16	Albemarle (Bank's Bay)	Very common but passing season	Common but passing season	Common	Common, Larvae and pupa found
" 18–19	Narborough	Few seen		Fairly common	
" 24–26	Albemarle (South)	Scarcer than in March	Quite common mid-season	Common, passing season	
May 1– 3	Albemarle (South)	Not common, flown specimens	Rather common, passing season		
" 14–17	Charles	Rather common, passing season	Very common at 1700 ft., passing season	Common, mid-season	Rare
" 23–31	Charles	Rather common, passing season	Very common at 1700 ft., passing season	Common, mid-season	Rare
June 1– 4	Charles				
" 23–30	Hood	No	Butterflies see	n	
July 1– 2	Hood	No	Butterflies see	n	
" 3– 8	Chatham	Rare	Rare	Rare	Rare
" 9–10	Barrington				
" 11–24–26	Indefatigable and South Seymour	Fairly common, mid-season		Rather common	Common, in season
" 28–31	James (Sullivan Bay)				
August 1– 5	James (Sullivan Bay)	Scarce	Scarce	Scarce	Scarce
" 7–8	James (James Bay)	Few, both fresh and faded	Fairly common	Common, but rather worn, hatched ova	Rather scarce
" 10–12	Albemarle (Cowley Mt.)	Rather rare, found about food plant, passing season	Fairly common, appears to be searching for place to oviposit	Fairly common	Rather rare, mid-season
" 14–15	Duncan				Rare
" 20–31	Albemarle (S. & St. Tomas)	Moderately common larvae at high altitude	Not common	Not at summit	Common, low altitude; scarce and old, high altitude

Table Showing the Insect Seasons as Illustrated by Notes on Four Species of Butterflies, Galapagos Archipelago—*Continued*

Season	Island	BUTTERFLY			
		Callidryas eubule	Agraulis galapagensis	Leptotes parrhasioides	Eudamus galapagensis
Sept. 1– 5	Albemarle (S. & St. Tomas				
1906 " 7–10	Chatham	Rather rare	Scarce	Fairly plentiful	
" " 14–15	Tower				
" " 17–18	Bindloe				
" " 19–22	Abingdon		Rare	Rather rare, at 1000 ft.	
1905 " 25–30	Hood			Scarce	
1905 Oct. 1– 2	Hood			Scarce	
" " 3–12	Charles	Common, ovipositing	Rather rare, ovipositing	Passing season, common at 1100 ft.	Rare, 1200 ft.
" " 15–18	Chatham (Wreck Bay)	Common, at 1000 ft.	Rather rare	Common, passing season	Common, at 1000 ft.
" " 20–24	Barrington				
" " 24–28	Indefat. (South)	Rather rare	Rare		Rather rare
1905 Nov. 1– 3	Albemarle (South)	Moderately common	Moderately common	Moderately common	
" " 5–17	Indefatigable (South)	Common and fresh, at 600 ft.	Rare		Common, mid-season
" " 18–20	Indefat. (NE.)				
" " 21–30	Indefat. and S. Seymour				

Kansas University,
November 29, 1910.

September 28, 1911

EXPLANATION OF PLATE XX

Fig. 1. *Agraulis vanillæ* Linn. ♂ Old Colony Settlement, Albemarle Island, April 24, 1906.

Fig. 2. *Agraulis vanillæ* Linn. ♂ Under surface. Tagus Cove, Albemarle Island, March, 1906.

Fig. 3. *Cupido parrhasioides* Wallengren. ♂ Chatham Island, October, 1905.

Fig. 4. *Cupido parrhasioides* Wallengren. ♀ Chatham Island, Oct. 1905.

Fig. 5. *Cupido parrhasioides* Wallengren. ♂ Under surface. Chatham Island, October, 1905.

Fig. 6. *Eudamus galapagensis* Williams. ♂ Wreck Bay, Chatham Island, October, 1905.

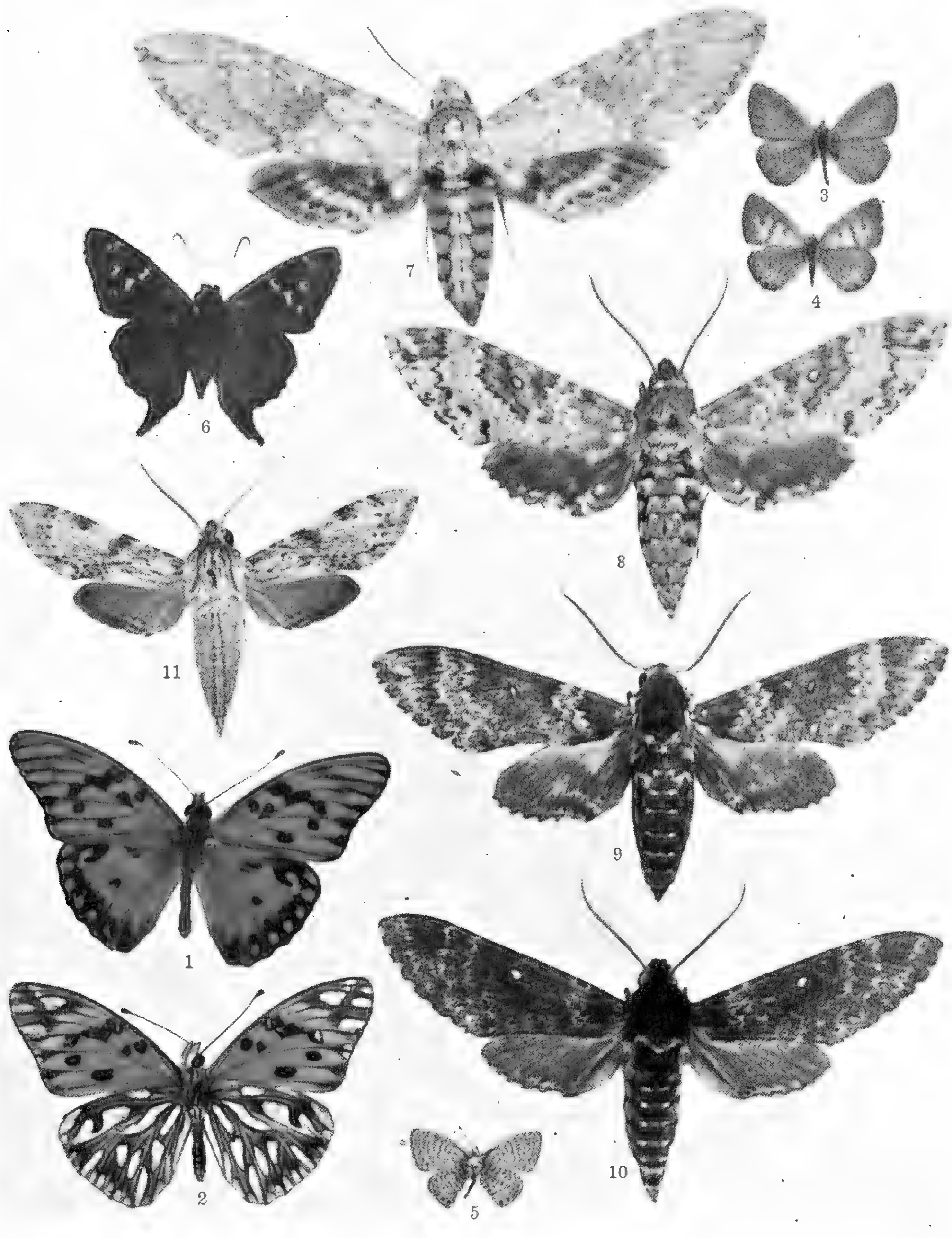
Fig. 7. *Phlegathontius leucoptera* Roth. and Jordan. ♀ Wreck Bay, Chatham Island. Raised from caterpillar caught March 12, 1906.

Fig. 8. *Phlegathontius* (*Protoparce*) *Calapagensis* Holland. ♂ Light phase. Charles Island, February, 1906.

Fig. 9. *Phlegathontius* (*Protoparce*) *Calapagensis* Holland. ♂ Dark phase. Tagus Cove, Albemarle Island, April 12, 1906.

Fig. 10. *Phlegathontius* (*Protoparce*) *Calapagensis* aberration *nigrita* Roth. and Jordan. ♂ Tagus Cove, Albemarle Island, April 12, 1906.

Fig. 11. *Dilophonota obscuris Conformis* Roth. and Jordan. ♂ Tagus Cove, Albemarle Island, March, 1906.



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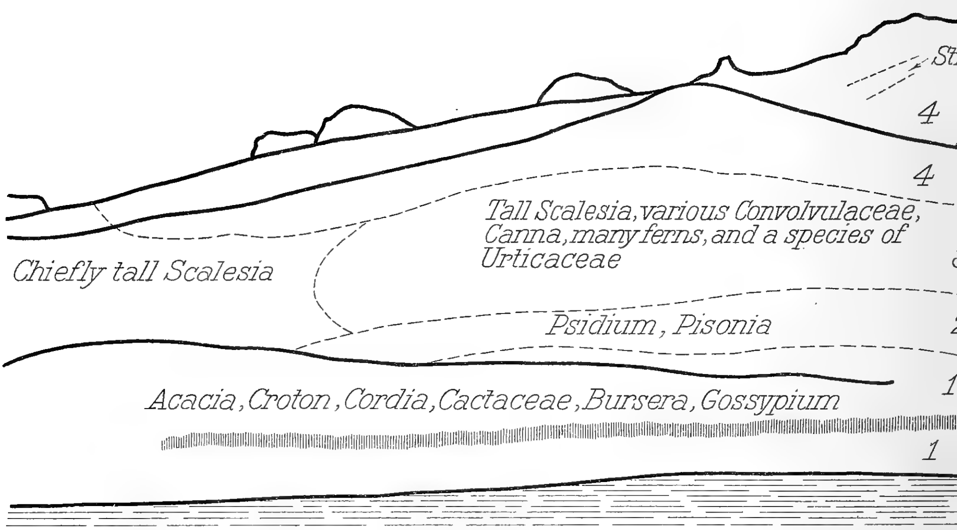
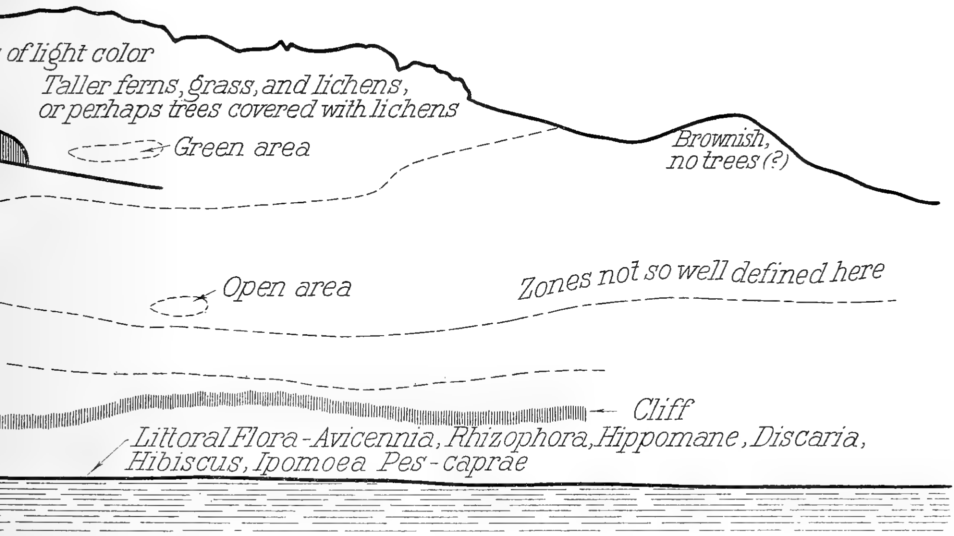
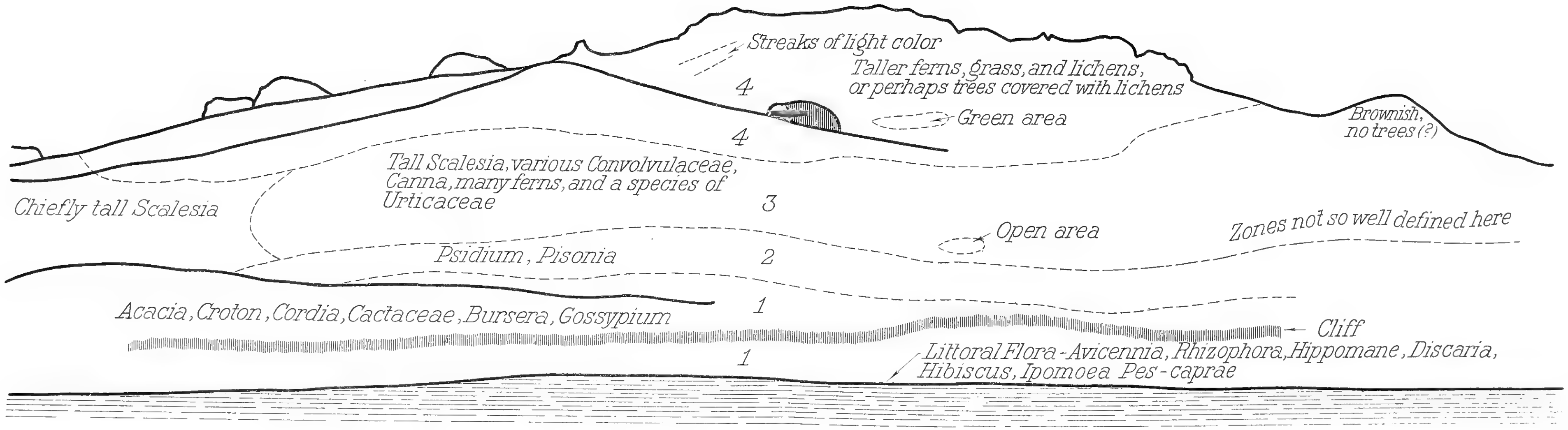


THE WEATHER (S.E.) SIDE OF INDEFATIGABLE ISLAND
1 Dry Zone - to 200 ft., 2 Light Green Zone - to 400 ft., 3 Gr



OWING THE PLANT ZONES (sketched from nature)
Zone - to 1500 ft., 4 Brown Zone - to summit, about 3000 ft.



THE WEATHER (S.E.) SIDE OF INDEFATIGABLE ISLAND SHOWING THE PLANT ZONES (sketched from nature)
1 Dry Zone - to 200 ft., 2 Light Green Zone - to 400 ft., 3 Green Zone - to 1500 ft., 4 Brown Zone - to summit, about 3000 ft.

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VOL. I, pp. 323-374 JANUARY 17, 1912

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IV

The Snakes of the Galapagos Islands

BY

JOHN VAN DENBURGH

Curator of the Department of Herpetology

SAN FRANCISCO

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IV

THE SNAKES OF THE GALAPAGOS ISLANDS

BY JOHN VAN DENBURGH
Curator of the Department of Herpetology

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January 15, 1912

INTRODUCTION

In reporting upon the snakes secured by the Academy through its expedition of 1905 and 1906, I wish first of all to express my appreciation of the energy and care of my assistant, Mr. Joseph R. Slevin, upon whom, as chief herpetologist of the expedition, rested the responsibility of gathering and preserving the collection which has made this paper possible. I am indebted to him also for the counting of many scales. To Mr. E. S. King, and to other members of the expedition who aided in the collection of reptiles, my thanks are due. Professor Charles H. Gilbert, as so often in the past, has aided me by kindly permitting me to make use of specimens in the collection of Stanford University. From Dr. George A. Boulenger I have received, regarding certain specimens in the British Museum, information which has been most useful.

All measurements are given in millimeters. The numbers by which specimens are designated are the serial numbers of the reptile collection of the Academy, except such as are preceded by the letter S. These latter are the numbers attached to specimens in the collection of Stanford University, and refer to the register of its reptile collection.

The sea snake *Hydrus platurus* is here first recorded from the Galapagos. The following snakes are described as new:

Dromicus hoodensis
Dromicus slevini
Dromicus steindachneri
Dromicus occidentalis
Dromicus occidentalis helleri

PREVIOUS COLLECTIONS AND STUDIES

It is probable that the presence of snakes in the Galapagos Archipelago was first recorded by Dampier, who, in his *Voyages*, mentions green serpents seen there in 1684. Delano, Porter, and Darwin refer to them briefly in their *Narrative* and *Journals*.

Darwin, I believe, was the first to carry back to Europe a specimen of this snake. It was caught on Charles Island, and

Bibron considered it identical with a Chilian species. It was so regarded until 1860, when Günther, in the *Proceedings of the Zoological Society of London,* pointed out certain differences between the mainland and the Galapagos snakes, and named this Charles Island specimen *Herpetodryas biserialis.*

In 1869, Peters recorded a specimen in the Museum of Stockholm, collected in the Galapagos by Dr. Kinberg, as identical with the mainland *Dromicus chamissonis.* Günther in the *Zoological Record* for 1869, remarks that he "can confirm Professor Peters's observations, having now seen a series of examples of this snake from these islands. There were two varieties, one very similar to the common continental form, the other identical with the snake described by him from a young specimen under the name of *Herpetodryas biserialis.* Some examples were intermediate between the varieties, so that there is no doubt about their specific identity. The syncranterian character of the dentition is not well developed in this species."

The Hassler expedition secured no snakes in the Galapagos Islands, but one was seen upon Jervis Island, in June, 1872.

Still later, Dr. Steindachner secured for the Vienna Museum five snakes which Dr. Habel had collected in the Galapagos Archipelago in 1868, and which, he says, are the specimens to which Dr. Günther referred in his note in the *Zoological Record* for 1869. These specimens showed two types of coloration—spotted and striped—and Dr. Steindachner regarded them as two varieties of the continental *Dromicus chamissonis.* The spotted form he called *Dromicus chamissonis* var. *dorsalis,* while the striped specimens were named *Dromicus chamissonis* var. *habelii.* These snakes were said to have been found on Indefatigable, Hood, Charles and Jervis islands; but the gastrostege counts given by Dr. Steindachner, and his description of the post oculars and temporals, differ from the conditions found in the snakes of Charles and Hood islands to an extent which enables us to say that his specimens must have come from Indefatigable or Jervis.

No other names have been proposed for Galapagos snakes. As the years have passed, and snakes have been found on Charles, Hood, James, Jervis, Barrington, Indefatigable, Albemarle, and Narborough islands, authors have sometimes regarded them as identical with the mainland *Dromicus chamissonis,* sometimes as one or two distinct varieties (spotted and striped) of this mainland species, sometimes as a distinct species, *D. biserialis,* with or without a subspecies, *D. biserialis habelii.* As Garman put it, "there is nothing in the published evidence to show that the striped form, the spotted form, that with two postorbitals, and that with three do not occur amongst the individuals of any of the localities inhabited by this snake. Günther's type has three postorbitals and is spotted, Dr. Baur's specimen has three postorbitals and is striped, and Steindachner's varieties, both striped and spotted, have but two postorbitals."

Even as regards the generic term to be applied to these snakes, there has not been agreement among herpetologists. Günther at first placed them in the genus *Herpetodryas,* but later followed Peters in referring them to the genus *Dromicus* of Bibron. Here they have been placed also by Steindachner and Boulenger. Cope, in 1889, applied to them the generic name *Opheomorphus* Fitzinger, but Garman has shown that this is a synonym of *Liophis* Wagler, being founded on the same type. Garman reverted to Fitzinger's *Orophis* of 1843—the type of which he states is *Coronella chamissonis* Wiegm.—because he held that the species of the Galapagos Archipelago of Chile, and of Peru differed generically from the West Indian species, which he retained in Bibron's genus *Dromicus.* Still later, Cope divided all these snakes into three genera: *Dromicus* Bibron, with no scale-pits; *Monobothris* Cope, with one scale-pit; and *Alsophis* Fitzinger, with two scale-pits. *Monobothris* Cope has as type *Dromicus chamissonis,* and is therefore a synonym of Fitzinger's *Orophis* which was based upon the same species. Stejneger has called attention to the fact that Bibron's *Dromicus,* 1842, is preoccupied by *Dromica* Dejean, 1826, and has revived Fitzinger's *Leimadophis* for the species which normally have no scale-pits; but the recent ruling of the Committee on Nomenclature of the International Congress sanctions the use of the name *Dromicus. Leimadophis* therefore must revert to the synonymy.

We thus have left three generic names—*Dromicus* Bibron, 1842, based upon a West Indian species without scale-pits; *Orophis* Fitzinger, 1843, established upon the Chilian species with one scale-pit; and *Alsophis* Fitzinger, 1843, the type of which is a West Indian snake with two scale-pits. The only character which has been held to distinguish these genera is the number of scale-pits. However, since the snakes of the Galapagos Archipelago are certainly congeneric, and since it will be shown that they have scales with two or one or no pits, there seems to be no good reason for recognizing more than one genus for all these snakes—West Indian, Chilian and Galapagos—which agree in every other respect. Any other course would mean the establishment of genera which were in no sense natural groups; for the Hood Island snakes are certainly more closely related to the other Galapagos serpents than they are to the West Indian species which have no scale-pits. It would seem that as differentiation has proceeded, certain of the species in the Galapagos have lost their scale-pits, as others have in the West Indies.

THE GENUS **Dromicus** BIBRON

1842, *Dromicus* (not *Dromica* Dejean, 1826) BIBRON, in Sagra's Hist. Fis. Pol. Nat. Cuba, IV, Rept., 1842, p. 133 (type *Coluber cursor*); BOULENGER, Cat. Snakes Brit. Mus., II, 1894, p. 118.

1843, *Alsophis,* FITZINGER, Syst. Rept., 1843, p. 26 (type *Psammophis antillensis* Schlegel); STEJNEGER, Report U. S. Nat. Mus. for 1902, 1904, p. 699.

1843. *Leimadophis,* FITZINGER, Syst. Rept., 1843, p. 26 (type *Coronella almadensis=D. reginæ*); STEJNEGER, Report U. S. Nat. Mus. for 1902, 1904, p. 694.

1843, *Orophis,* FITZINGER, Syst. Rept., 1843, p. 26 (type *Coronella chamissonis* Wiegm.). GARMAN, Bull. Essex Inst., XXIV, 1892, p. 86.

1843, *Calophis,* FITZINGER, Syst. Rept., 1843, p. 26 (type *Herpetodryas cursor*).

1854, *Tæniophis,* GIRARD, Proc. Acad. Nat. Sci. Phila., 1854, p. 226 (type *T. tantillus=D. chamissonis*).

1862, *Haliophis* COPE, Proc. Acad. Sci. Phila., 1862, p. 77 (emend.).

1882, *Alophis,* STAHL, Fauna Puerto-Rico, 1882, p. 70 (err.).

1884, *Ocyophis,* COPE, Proc. Amer. Philos. Soc., XXIII, 1884, p. 491 (type *O. ater*).

1887, *Halsophis,* COPE, Proc. U. S. Nat. Mus., X, 1887, p. 439 (emend.); COPE, Trans. Am. Philos. Soc., XVIII, 1895, p. 201.

1894, *Liophis* (not of Wagler, 1830), BOULENGER, Cat. Snakes Brit. Mus., II, 1894, p. 126 (part).

1894, *Monobothris,* COPE, Amer. Nat., 1894, p. 841 (type *Dromicus chamissonis*); COPE, Trans. Am. Philos. Soc., XVIII, 1895, p. 201.

All of the land snakes of the Galapagos Archipelago agree in their dental and hemipenial characters. The maxillary teeth vary from ten to twelve in number, followed, after an interspace, by two larger ones. Thus, counting all sockets as well as teeth:—

No. 11935, *Dromicus hoodensis,* from Hood Island, has 12 and 2.

No. 11800, *Dromicus hoodensis,* from Hood Island, has 12 and 2.

No. 11926, *Dromicus hoodensis,* from Hood Island, has 12 and 2.

No. 11930, *Dromicus hoodensis* from Hood Island, has 10 and 2.

No. 10782, *Dromicus dorsalis,* from James Island, has 11 and 2.

No. 10483, *Dromicus dorsalis,* from South Seymour Island, has 10 and 2.

No. 11488, *Dromicus occidentalis,* from Narborough Island, has 11 and 2.

No. 10281, *Dromicus occidentalis helleri,* from Brattle Island, has 10 and 2.

No. 10617, *Dromicus steindachneri,* from Jervis Island, has 11 and 2.

The hemipenes of *Dromicus hoodensis* (No. 9336) from Hood Island, of *Dromicus slevini* (No. 12216) from Duncan Island, and of *Dromicus dorsalis* (No. 10483) from South Seymour Island, all are divided, with furcate sulcus, calyculate, spinous proximally, and with no apical disc. They agree in every respect with the figures given by Cope of these organs taken from *"Monobothris" chamissonis, "Alsophis" angulifer* and *Dromicus parvifrons* of Peru, Cuba and Hayti.

Scale-pits do not occur in all the scales of any specimen from the Galapagos. When they are present, they are most constant in the scales in or near the region of the lateral stripe and on the upper surface of the tail. Most careful examination has failed to disclose any trace of pits in any scale of any of the Galapagos snakes having fewer than one hundred and ninety gastrosteges. The Hood Island and the Charles Island species also normally have no scale-pits; but long search on the thirty-six specimens at hand from Hood resulted in the discovery of a single scale with one pit. Excepting the species from these two islands, all of the snakes of the Galapagos with more than two hundred gastrosteges bear scales with two pits. They also have scales with no pits, and usually others with one pit. In some cases large scales on the tail have three or four pits. While these pits, therefore, are not of generic value, they are of great use in the separation of species, as shown in the following:

Key to Galapagos Species of Dromicus

a.—No scale-pits.
  b.—Gastrosteges more than 195 (203-214).
    c.—General coloration in spots; scales in 19 rows. Charles and Gardner-near-Charles.
      Dromicus biserialis.—p. 336.
    c.[2]—Striped, the stripes fading out posteriorly; scales in 17 or 19 rows. Hood and Gardner-near-Hood.
      Dromicus hoodensis.—p. 338.
  b.[2]—Gastrosteges fewer than 195 (169-183).
    cc.—Postoculars two; no longitudinal light stripes. Duncan, Albemarle, Narborough.
      Dromicus slevini.—p. 351.
    cc.[2]—Postoculars normally three (rarely two); longitudinal light stripes present. Jervis, South Seymour, Indefatigable.
      Dromicus steindachneri.—p. 353.
a.[2]—Scale-pits present.
  bb.—Gastrosteges more than 210 (213-252).
    ccc.—Gastrosteges usually not more than 232 (213-236). James, Jervis, Barrington, Indefatigable, South Seymour.
      Dromicus dorsalis.—p. 341.
    ccc.[2]—Gastrosteges not fewer than 236 (236 to 252); prominent light markings on nape spots or transverse blotches.
      d.—Usually striped; light nuchal blotches and a series of dark spots on tips of gastrosteges and on lower lateral scales very distinct. Narborough.
        Dromicus occidentalis.—p. 347.
      d.[2]—Spotted, without longitudinal light stripes; no series of definite rounded blackish spots on lateral scales of first and second rows; light nuchal markings less prominent. Albemarle and Brattle.
        Dromicus occidentalis helleri.—p. 349.
  bb.[2]—Gastrosteges fewer than 210 (178-201). Chile and Peru.[1]
      Dromicus chamissonis.

The Material for this Study

It will be seen that I have recognized seven kinds of land snakes from the Galapagos Archipelago. This has been made

[1] There can be little doubt that more than one species occurs in Chile and Peru. The wide range in the number of gastrosteges would indicate this, and Dr. Boulenger, who most kindly has examined the scale-pits in the specimens in the British Museum in response to my request, writes me that most of the Chilian and Peruvian specimens have scales with single pits, while those from Chiloe have scales with two pits. These specimens from Chiloe doubtless represent a distinct species, as yet unnamed.

possible only by the large number of specimens secured. The collection included ninety-eight snakes from these islands, and I have also had the privilege of examining eight in the Stanford University collection, making, in all, one hundred and six specimens, distributed as follows:

Hood	36
Indefatigable	24
Barrington	15
James	8
Narborough	7
South Seymour	5
Jervis	4
Brattle	2
Gardner-near-Hood	1
Gardner-near-Charles	1
Duncan	1
Cowley Mt., Albemarle	1
Cape Berkeley, Albemarle	1

Although this material seems large, it is quite inadequate for the final settlement of many of the questions which present themselves. The series from Hood is the only one that really is satisfactory. The Indefatigable series might at first seem so, but one of the species found on that island is represented only by a single specimen; and the twenty-three examples of the other species are not enough to furnish a satisfactory explanation of the presence of both spotted and striped styles of coloration. The numbers secured on the other islands are, of course, still less satisfactory, especially when one recalls that we have two distinct species from several of the islands.

It is probable, too, that larger series from many of the islands would enable us to recognize specific or subspecific differences which are now hidden by individual variation. Thus, the snakes which I am forced to group together as *Dromicus slevini* may very well represent at least two different races. Similarly, the snakes of James and Jervis may be found to differ from those of Barrington and Indefatigable, as is pointed out under the head of *Dromicus dorsalis,* and those of Brattle possibly will be found to be not identical with those of northern Albemarle. The solution of these problems, however, must await the gathering of larger series from all the islands except Hood, and perhaps Charles.

No snakes ever have been taken on Culpepper, Wenman, Abingdon, Bindloe, Tower, or Chatham islands. One of the residents of Chatham told Mr. Slevin that snakes were not uncommon there, but careful search failed to bring one to light. They must now be quite rare on Charles; for no member of our expedition saw one on Charles Island itself, although one was secured on the close-lying islet known as Gardner-near-Charles.

Origin of the Galapagos Snakes

The closest relatives of the serpents of the Galapagos Archipelago are a number of distinct species native to the Bahamas, Greater and Lesser Antilles, Costa Rica, and all of South America—species which Boulenger includes in the genera *Dromicus* and *Liophis*. Whether or not all of these species actually belong in the genus *Dromicus* cannot be positively stated until the hemipenial structure of each has been examined. The results of such an examination, however, cannot be expected to affect the truth of the statement that the Galapagos snakes have very close relatives throughout the West Indies and South America.

This being true, the snakes of these localities must have had a common origin. Either the West Indian and Galapagos snakes have been derived from South America, or else all must be descendants of species which, in a former geological period, occupied a great central land-mass which has sunk below the level of the sea, leaving mere remnants in Central America, northern South America, the Antilles, and the Galapagos. Much may be said in favor of each of these theories. I believe that the data are not yet at hand which will enable us to choose between them.

Either view implies a former land connection and a continental origin of the Galapagos ophidian fauna. I cannot bring myself to share the opinion of those who believe that the fauna of the Galapagos has reached these islands by the more or less accidental agency of the winds and ocean currents. The various species must have spread slowly over some continental mass with which the Galapagos were connected or of which they formed a part.

When the Galapagos finally became separated from the rest of the world, it is probable that most or all of the present islands remained for a time united. The northern islands must have been the first to establish an independent existence, and it is possible that their separation may have occurred before snakes reached the Galapagos, and, therefore, before the old continental bridge was broken; but I think it more probable that snakes once inhabited these islands also. Culpepper and Wenman islands are, of course, unfavorable for the continued existence of snakes. Just why they never have been found on Abingdon and Bindloe is indeed hard to understand.

While all of the snakes of the Galapagos Archipelago are closely related, they nevertheless are of two distinct types. These are the small snakes with no scale-pits and fewer than one hundred and ninety gastrosteges, and the group of species with more than two hundred gastrosteges.

These two groups I believe to be the descendants of two species which originally occupied the Galapagos. My chief reasons for this opinion are the absolute distinctness of the two groups, and the fact that representatives of both have been found upon the same islands.

The snakes with more than two hundred gastrosteges fall naturally into three subgroups. These are: first, the snakes of Charles and Hood; second, those of Narborough, Albemarle and Brattle; third, those of James, Jervis, Indefatigable and Barrington.

The first of these subgroups is the most distinct. Differentiation has progressed much farther on Charles and Hood islands than elsewhere in the archipelago. Therefore, we may believe that these southern islands were separated from the central ones before the latter were divided one from another.

The snakes from Charles and Hood islands are very closely allied. They agree in all essential characters except color. They alone of the larger Galapagos snakes lack the scale-pits, and both have the same number of gastrosteges. Differentiation could hardly have occurred along lines so absolutely parallel in two unconnected islands. We are therefore led to believe that Charles and Hood islands were connected, and formed a single island for a long time after their separation from the more northern or central islands.

The snakes of the two Gardner islands agree in every detail with those of the larger islands to which these are adjacent, so that the separation of the one Gardner from Charles, and of the other Gardner from Hood, must have occurred still more recently.

The second and third subgroups are much more closely related to each other than to the first. This may be considered to indicate that all of the central islands from Narborough to Barrington and from James to Brattle—with the possible exception of Duncan—remained connected for a considerable period after the separation of the northern and the southern islands.

The distribution of the second and third subgroups, and of *D. slevini* and *D. steindachneri,* indicates that there occurred at a still later date the separation of this central land into two large islands; an eastern, including the present James, Jervis, Indefatigable and Barrington Islands; and a western, of which Narborough, Albemarle and Brattle formed parts.

The more recent changes are much less clearly indicated by the ophidian fauna, but certain color-differences render it probable that Narborough became separated from Albemarle before breaks in the eastern island occurred, first between Barrington and Indefatigable, then between James and Indefatigable, and lastly between James and Jervis.

The snakes of Albemarle are at present known only from two specimens—one *Dromicus slevini* from Cowley Mountain, and one *Dromicus occidentalis helleri* from Cape Berkeley. Under such conditions little can be deduced as to the past history of this island without the use of evidence furnished by other groups of its inhabitants. This evidence I do not now wish to use; for I believe more accurate results can be attained by attempting to read the story of each group separately, and then comparing results. The mixing of evidence here, it seems to me, would be only less confusing than the jumbling together of data derived from distribution, geology, paleontology, and ocean-soundings. Each should be worked out separately before comparing results, in order that one may serve to confirm or disprove the other.

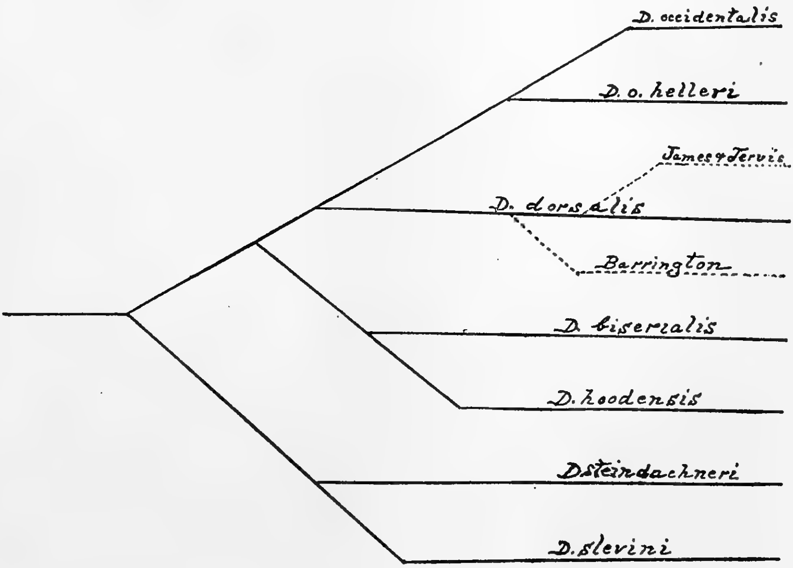
If we have read this story of the snakes correctly, there is nothing in the least suggestive of an unconnected group of volcanic islands thrust independently above the surface of the ocean, to become the home of such animals as might reach them through more or less accidental or occasional agencies of dispersal. Instead of telling of the elevation of new islands, the evidence points to the gradual depression and partial submersion of a more extensive land-mass which must have had direct or indirect connection with continental America.

When we consider the snakes from the various islands as regards the style of their coloration—whether spotted or striped—we find an interesting fact. On almost every island only one style of coloration is present. Thus, all the snakes of Hood, James, and Jervis are striped; while on Charles, Albemarle, and Brattle only spotted snakes have been found. But when we come to Narborough, Indefatigable and Barrington islands, we find that each island has both spotted and striped snakes. Why should a difference of coloration so constant on other islands be inconstant here?

We have seen that the snakes of Charles and of Hood are alike, except that those of Charles are spotted while those of Hood are striped. If these two islands should now become connected for a time, we might expect spotted snakes to wander to Hood, and striped ones to appear on Charles. If these islands again became separated, we should find both spotted and striped snakes on each island; but if the connection had been short, we might expect a majority of the snakes of Charles, and a minority of those of Hood, to show the spotted coloration.

Fifty-three per cent of the fifteen snakes from Barrington are spotted. Seventy-four per cent of the twenty-three specimens from Indefatigable are striped. More numerous specimens might change the proportion and show that the suggested explanation is quite wrong, or that differentiation is now for the first time developing between the Indefatigable and the Barrington snakes. The parallelism between the conditions actually found on Barrington and Indefatigable, and the conditions which we might expect to find upon Charles and Hood, should they now become connected and later separated again, is strongly suggestive. It might be thought to point to an elevation and depression of Barrington and Indefatigable subsequent to the general depression of the archipelago. This view might be strengthened by the fact that all of the snakes of South Seymour Island are striped. Certain slight peculiarities of coloration, however, distinguish most of the Barrington Island specimens from those of Indefatigable. With respect to these peculiarities, the striped snakes of Barrington differ from the striped snakes of Indefatigable, and agree with the spotted snakes from their own island. Similarly, the spotted snakes of Indefatigable differ from the spotted snakes of Barrington, but agree with striped specimens from Indefatigable. Therefore, we must regard this as a case of dichromatism, occurring in the snakes of these two islands; but if similar proportions hold in larger series, it will be evident that specific differentiation has already begun, and may ultimately lead to the formation of spotted and striped races here as it has on Charles and Hood and on Albemarle and Narborough islands.

The following diagram will serve to show the probable relationship of the snakes of the Galapagos.



Suggestions to Future Students

Future collectors in these islands should strive to secure specimens of the snake of Chatham Island, if such there be. Doubtless, it will prove to be a most interesting new species. Duncan Island is one of the most difficult to understand of all the islands of the archipelago. Its snakes are represented in collections only by a single specimen of *D. slevini,* although there can be little doubt that a larger species, probably with two scale-pits, remains to be found there. Other specimens of *D. slevini* have been seen on Duncan Island; and, since these agreed perfectly in coloration with the type, it is almost certain that additional specimens from Duncan, Albemarle, and Narborough will show that more than one species is here referred to *D. slevini.* Many more specimens of *D. steindachneri* also are needed. Much remains to be learned of the larger snakes of Albemarle, which now are known from only one or two specimens. Dr. Boulenger writes me that the British Museum has a specimen with 222 gastrosteges, which is said to have been collected at Tagus Cove. I am inclined to doubt the correctness of this label; but if no error has crept in, there must be more than one species with two scale-pits in this island. The question then arises: Is there in Albemarle a distinct race of snake on each of the five principal mountains, as there is of tortoise? The answer must be based on many specimens yet to be collected. The question of the necessity of further division of *Dromicus dorsalis* also remains for future collectors to solve.

Discussion of the Species

Dromicus biserialis (Günther) Charles Island Snake

1860, *Herpetodryus biserialis* Günther, Proc. Zool. Soc. London, 1860, p. 97 (type locality **Charles Island**).

1869, *Dromicus chamissonis* Günther, Zool. Record, 1869, p. 115 (part); Boulenger, Cat. Snakes Brit. Mus., II, 1894, p. 119 (part).

1876, *Herpetodryas dorsalis,* Steindachner, Festschr. Zool.-bot. Ges. Wien., 1876, p. 304 (err).

1892, *Orophis biserialis* GARMAN, Bull. Essex Inst., XXIV, 1892, p. 85 (part).

1903, *Dromicus biserialis biserialis* HELLER, Proc. Washington Acad. Sci., V, 1903, p. 93 (part).

Diagnosis.—No scale-pits; scales in 19 rows; gastrosteges 209; urosteges 108 to 110, all paired; postoculars three; temporals usually 2+2; spotted.

Type.—British Museum. **Charles Island, Galapagos Archipelago.** Charles Darwin. 1835.

Distribution.—Charles and Gardner-near-Charles islands, Galapagos Archipelago.

Material.—Only two specimens of this species are in collections. These are: the type, a young specimen from Charles Island, preserved in the British Museum, and one female specimen from Gardner Island—No. 9448 of the Academy collection.

Description of No. 9448.—Head rather long, with flattened top and rounded snout. Rostral plate large, a little broader then high, hollowed below, and bounded behind by internasal, anterior nasal and first labial plates. Plates on top of head are: a pair of internasals, a pair of prefrontals, supraocular and part of preocular of each side, a frontal, and a pair of large parietals. Internasals much smaller than prefrontals. Frontal longer than parietal suture. Anterior and posterior nasals distinct. Loreal well developed, longer than high. One large preocular with a very small one below it on each side of head. Postoculars three. Temporals two followed by two or three. Eight superior and ten inferior labials, sixth upper and sixth or seventh lower largest, fourth or fourth and fifth upper reaching eye, first pair of lower meeting on median line. Genials in two pairs, posterior a little longer, anterior touching five labials. Scales on body smooth, without pits, in nineteen rows. Anal plate divided. Gastrosteges two hundred and nine. Tail complete. Urosteges one hundred and eight, all paired.

The color above is a pale grayish olive. A dark streak runs back from the eye. The infralabials and the posterior superior labials are blotched with yellowish white. There is a yellowish-white blotch on each side of the nape. There are no traces of longitudinal bands on the body, but along the back is a series of irregular dark brown cross bars or alternating spots. A few indications of similar spots may be made out on the sides. The tail is unspotted except near its base. The lower surfaces are creamy white, plentifully dotted or clouded with dark gray. There are no very distinct blackish-brown lateral spots on the anterior gastrosteges.

Length to anus, 590 mm.
Length of tail, 220 mm.

Variation.—The type specimen from Charles Island has two hundred and nine gastrosteges, one hundred and ten urosteges, three postoculars, scales in nineteen rows, and the spotted style of coloration.

General Remarks.—Snakes must be very rare on Charles Island, for none were seen there by any member of our expedition, although careful search was made for them. It is probable that the ravages of the smaller kinds of mammals that have been introduced there—particularly rats and cats—have pushed them to the verge of extinction, as they have the *Tropidurus*. It is probable that a longer search would show that snakes are still to be found on Champion and Enderby as well as on Gardner, for *Tropiduri* still are fairly abundant on all these islets.

The Charles Island snake is most closely related to the Hood Island species. It differs from that species in having numerous dorsal spots, no dorsolateral bands, and no definite dark spots on the anterior gastrosteges.

Dromicus hoodensis new species. Hood Island Snake

1892, *Orophis biserialis* Garman, Bull. Essex Inst., XXIV, 1892, p. 85 (part).

1903, *Dromicus biserialis habeli* Heller, Proc. Washington Acad. Sci., V, 1903, p. 93.

Diagnosis.—No scale-pits; scales in 17 or 19 rows; gastrosteges 203 to 214; urosteges 91 to 114, usually all paired; postoculars three; temporals usually 2+2; never spotted; striped, the stripes becoming obsolete posteriorly.

Type.—Male. California Academy of Sciences No. 11799. **Hood Island, Galapagos Archipelago.** J. R. Slevin. June 23, 1906.

Distribution.—Hood and Gardner-near-Hood islands, Galapagos Archipelago.

Material.—One specimen collected by Dr. Baur on Hood Island has been recorded by Garman. Two secured on Hood by Heller are Nos. 4970 and 4971 in the collection of Stanford University. The Academy has thirty-four from Hood and one from Gardner-near-Hood.

Description of the type.—Head rather long, with flattened top and rounded snout. Rostral plate large, a little broader than high, hollowed below, and bounded behind by internasal, anterior nasal and first labial plates. Plates on top of head are: a pair of internasals, a pair of prefrontals, supraocular and part of preocular of each side, a frontal, and a pair of large parietals. Internasals much smaller than prefrontals. Frontal slightly longer than parietal suture. Anterior and posterior nasals distinct. Loreal well developed, longer than high. One preocular. Postoculars three. Temporals two followed by two. Eight superior and nine inferior labials, sixth upper and fifth or sixth lower largest, fourth and fifth upper reaching eye, first pair of lower meeting on median line. Genials in two pairs, posterior a little longer, anterior touching five labials. Scales on body smooth, without pits, in seventeen rows. Anal plate divided. Gastrosteges two hundred and seven. Tail complete. Urosteges one hundred and thirteen, all paired.

The color above is deep olive brown becoming paler posteriorly and seal brown toward the head. A light dorsolateral band, about two scales wide, arises on the upper postocular, crosses the parietal, and continues along the fifth and sixth rows of scales. This yellowish-brown band becomes less distinct on the middle third of the body and nearly obsolete posteriorly. The tail is unicolor, olive, becoming yellowish olive toward the tip. The dark brown postocular or temporal bar is continuous with the brown band on the side of the neck. There is no light nuchal blotch. The labials are yellowish white marked with blackish olive. The first and second rows of scales on the neck are whitish, marked anteriorly with a row of blackish spots, continuous with a similar row formed of one spot near the lateral extremity of each gastrostege from about the fourth to twenty-second. The lower surfaces are yellowish dotted or clouded with grayish olive.

Length to anus, 518 mm.
Length of tail, 217 mm.

Variation.—All the males have seventeen rows of scales, while all of the females have nineteen rows. Careful search of every specimen failed to disclose any scale-pits except in the case of No. 9306, on which one scale showing a single pit was found. The gastrosteges range in number from two hundred and three to two hundred and fourteen. The urosteges in specimens with complete tails vary from ninety-four to one hundred and fourteen in males and from ninety-one to one hundred in females. All of the urosteges are paired except in the specimen from Gardner Island, which has two undivided. The postoculars are always three. The temporals normally are 2+2, and the supralabials eight. The following table shows the scale-counts. In the urostege column c indicates that the tail is complete, while + is affixed to counts when the tip of the tail is missing.

TABLE OF SCALE COUNTS, *Dromicus hoodensis*

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Superior labials	Loreal	
9336	♂	17	206	105 c	1	3	2+2	8	1	
9370	♂	17	211	109 c	1	3	2+2	8	1	
9420	♂	17	208	110 c	1	3	2+2	8	1	
10920	♂	17	204	112 c	1	3	2+2	8	1	
10957	♂	17	214	113 c	1	3	2+2	8	1	
11799	♂	17	207	113 c	1	3	2+2	8	1	Type
11800	♂	17	206	107 c	1	3	2+2	8	1	
11896	♂	17	208	68 +	1	3	2+2	8	1	
11921	♂	17	208	106 c	1	3	2+2	8	1	
11923	♂	17	205	105 c	1	3	2+2	8	1	
11931	♂	17	207	108 c	1	3	2+2	8	1	
11932	♂	17	207	94 c	1	3	2+2	8	1	
11934	♂	17	209	112 c	1	3	2+2	8	1	
11936	♂	17	208	114 c	1	3	2+2	8	1	
11937	♂	17	205	33 +	1	3	2+2	8	1	
11939	♂	17	208	107 +	1	3	2+2	8	1	Gardner Island
9304	♀	19	. . .	84 +	1	3	2+2	8	1	
9305	♀	19	205	93 c	1	3	2+2	8	1	
9306	♀	19	208	89 +	1	3	2+2	8	1	
9335	♀	19	210	96 +	1	3	2+2	8–9	1	
9384	♀	19	210	80 +	1	3	2+2	8	1	
10919	♀	19	210	90 +	1	3	2+2	8	1	
10921	♀	19	207	92 +	1	3	2+2	8	1	
10922	♀	19	206	94 c	1	3	2+2	8	1	
10958	♀	19	208	90 +	1	3	2+2	8	1	
11895	♀	19	211	96 c	1	3	2+2	8	1	
11920	♀	19	207	95 c	1	3	2+2	8	1	
11922	♀	19	211	95 +	1	3	2+2	8	1	
11924	♀	19	204	95 c	1	3	2+2	8	1	
11925	♀	19	209	96 c	1	3	2+2	8	1	
11926	♀	19	205	93 c	1	3	2+2	8	1	
11930	♀	19	207	91 c	1	3	2+2–1+2	9	1	
11933	♀	19	203	94 c	1	3	2+2	8	1	
11935	♀	19	210	90 +	1	3	2+2	8	1	
11938	♀	19	209	100 c	1	3	2+2	8	1	
Garman		19	209	. . . . . .	1	3	. . . .	8	1	
S.4970	♀	19	212	94 +	1	3	2+2–2+2	8	1	Stanford Univ.
S.4971	♂	17	206	98 c	1	3	2+2	8	1	Stanford Univ.
Brit. Mus.	♂	. .	203	104	. .	. .	. . . .	. .	. .	
Brit. Mus.	♂	. .	199	105	. .	. .	. . . .	. .	. .	
Brit. Mus.	♀	. .	211	. . . . . .	. .	. .	. . . .	. .	. .	

There is very little variation in coloration. All specimens are striped without trace of dorsal spots; and in all, the stripes fade out posteriorly. In specimens with nineteen rows of scales the stripes are on the sixth and seventh rows. All specimens but one show the characteristic spotting on the anterior gastrosteges only, with the white continuation of the labial streak just above. In the one exception, a young specimen, there are mere traces of the dark spots.

The largest specimen measures 820 mm. from snout to vent, and has a tail 253 mm. long.

Habits.—Nothing is known of the breeding habits of any of the Galapagos snakes. One of the Hood Island specimens (No. 9306) contained the tail of a large *Tropidurus* which it had eaten.

General remarks.—Snakes still are abundant on Hood Island. They seem to differ from those of Charles Island only in coloration; but, since the differences are constant in the large series at hand, they must be regarded as a distinct species.

The sexual difference in the number of scale rows in the snakes of this one island is worthy of note.

Dromicus dorsalis (Steindachner). Galapagos Snake

1869, *Dromicus chamissonis* Peters, Mon. Berlin. Acad., 1869, p. 719; Günther, Zool. Record, 1869, p. 115 (part); Boulenger, Cat. Snakes Brit. Mus., II, 1894, p. 119 (part).

1876, *Dromicus chamissonis* var. *dorsalis* Steindachner, Festschr. Zool.-bot. Ges. Wien, 1876, p. 306, pl. I, fig. 1 (type localities **Indefatigable** [probably] **or Jervis islands**).

1876, *Dromicus chamissonis* var. *Habelii* Steindachner, Festschr. Zool.-bot. Ges. Wien, 1876, p. 306, pl. I, fig. 1 (type localities **Indefatigable** [probably] **or Jervis islands**).

1889, *Opheomorphus chamissonis* Cope, Proc. U. S. Nat. Mus., XII, 1889, p. 147.

1892, *Orophis biserialis* Garman, Bull. Essex Inst., XXIV, 1892, p. 85 (part).

1903, *Dromicus biserialis biserialis* Heller, Proc. Washington Acad. Sci., V, 1903, p. 93 (part).

Diagnosis.—Scale-pits present; scales in 19 rows; gastrosteges 213 to 236; urosteges 95 to 119, usually some unpaired; postoculars two, rarely one; temporals usually 1+2 or 1+1; usually striped, sometimes spotted (on Barrington and Indefatigable).

Types.—Vienna Museum. **Galapagos Archipelago**, probably **Indefatigable** (or **Jervis**). Dr. Habel. 1868.

Distribution.—James, Jervis, Indefatigable, South Seymour and Barrington Islands, Galapagos Archipelago.

Material.—Five specimens collected by Dr. Habel, probably on Indefatigable or Jervis Islands, are in the Vienna Museum. I have examined fifty-one specimens in the Academy collection, as follows: twenty-three from Indefatigable, fifteen from Barrington, eight from James, three from South Seymour, and two from Jervis.

Description of No. 12062.—Adult male. Indefatigable Island. J. R. Slevin. July 16, 1906.

Head fairly broad, with flattened top and rounded snout. Rostral plate large, much broader than high, hollowed below, and bounded behind by internasal, anterior nasal and first labial plates. Plates on top of head are: a pair of internasals, a pair of prefrontals, supraocular and part of preocular of each side, a frontal, and a pair of large parietals. Internasals smaller than prefontals. Frontal longer than parietal suture. Anterior and posterior nasals distinct. Loreal well developed, little longer than high. One preocular. Two postoculars. Temporals one followed by two. Eight superior and ten inferior labials, sixth upper and fifth or sixth lower largest, fourth and fifth upper reaching eye, first pair of lower meeting on median line. Genials in two pairs, posterior a little longer, anterior touching five labials. Scales on body smooth, many with pits, in nineteen rows. Anal plate divided. Gastrosteges two hundred and twenty. Tail complete. Urosteges one hundred and thirteen, the second to seventh undivided.

The upper surface of the head is yellowish olive dotted with brown. There is a brown band from the rostral to the eye and from the eye to the side of the neck. The labials, chin, and throat are yellowish white dotted with dark brown. The body is longitudinally striped. The lower three (or, on the posterior part of the body, two) rows of scales are grayish brown. The next row is dark brown. The fifth, sixth, and seventh rows are yellowish white. The eighth row is dark brown, and the three rows along the middle of the back are lighter olive brown. The stripes are continued on to the tail, but the distal portion of this region is plain yellowish olive. The lower surfaces are yellowish white irregularly dotted and spotted with dark brown.

Length to anus, 670 mm.
Length of tail, 248 mm.

Variation: Indefatigable Island.— Only two specimens (Nos. 10233 and 10796) have all the urosteges divided. Some specimens have only the second urostege undivided. At the other extreme is No. 10232 in which the second to twenty-second, forty-fifth to forty-eighth, and sixty-third to sixty-fifth, are unpaired. The urosteges range from one hundred and five to one hundred and nineteen, and the gastrosteges from two hundred and seventeen to two hundred and thirty.

TABLE OF SCALE COUNTS, *Dromicus dorsalis* (Steindachner)
INDEFATIGABLE ISLAND

Number	Sex	Scale row	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal
10232	♂	19	224	118 c	1	2	1+1	8	1
10234	♂	19	222	117 c	1	2	1+2	8	1
10235	♂	19	226	98 +	1	2	1+2	8	1
10303	♂	19	219	95 +	1	2	1+2	8	1
10304	♂	19	224	99 +	1	2	1+1	8	1
10305	♂	19	221	105 +	1	2	1+2	8	1
10375	♂	19	225	114 c	1	2	1+2	8	1
10378	♂	19	225	107 c	1	2	1+2	8	1
10379	♂	19	223	117 c	1	2	1+2	8	1
10395	♂	19	226	119 c	1	2	1+2	8	1
10396	♂	19	221	110 +	1	2	1+2	8	1
10559	♂	19	227	107 +	1	2	1+2	8	1
12056	♂	19	224	116 c	1	2	1+1	8	1
12059	♂	19	229	105 c	1	2	1+2	8	1
12062	♂	19	220	113 c	1	2	1+2	8	1
12063	♂	19	218	102 +	1	2	1+2	8	1
12064	♂	19	217	112 c	1	2	1+2	8	1
12065	♂	19	225	102 +	1	2	1+2	8	1
10233	♀	19	228	10 +	1	2	1+2	8	1
10429	♀	19	230	107 c	1	2	1+2	8	1
10560	♀	19	225	45 +	1	2	1+1	8	1
10792	♀	19	229	74 +	1	2	1+2	8	1
10796	♀	19	229	105 c	1	2	1+2	8	1

The largest snake in the collection is No. 10792 which measures 950 mm. from snout to anus.

All but six of the Indefatigable snakes are colored like the one described above. Seventy-four per cent of the specimens from this island are striped. Of the remaining six specimens, two (Nos. 10233 and 12064) are spotted to the tail, while the other four (Nos. 10235, 10305, 10379, and 10792) are spotted anteriorly, but become nearly unicolor, or at most show only faint spots and bands posteriorly. Nos. 10233, 12064, 10235, and 10305 show longitudinal light stripes more or less clearly on the posterior part of the body. These stripes are wanting in Nos. 10379 and 10792.

The light stripes or nuchal blotches are continued forward very distinctly to the parietals in all Indefatigable specimens except 10235, 10305, 10379, 10396, and 10792. The light stripes, when present, never are confined to the scales of two rows, as is the case in snakes from Barrington.

South Seymour Island.—Two of the three specimens at hand have more numerous gastrosteges than have been found in any specimen from Indefatigable, James, Jervis, or Barrington islands. The third has a number equaled by only one Indefatigable specimen. In other respects these snakes are like the Indefatigable striped specimens, except that the coloring is a little lighter and brighter.

TABLE OF SCALE COUNTS, *Dromicus dorsalis* (Steindachner)
SOUTH SEYMOUR ISLAND

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal
10483	♂	19	232	88 +	1	2	1+2	8	1
10485	♂	19	230	113 c	1	2	1+2	8	1
10486	♀	19	236	......	1	2-3	1+2	8	1

James Island.—The James Island snakes show no important differences from the Indefatigable series. Nos. 10782 and 12153 have all urosteges paired. No. 12091 has the second to twenty-first undivided. No. 12092 has a similar condition in the sixth to eighth, tenth to fifteenth, seventeenth, nineteenth, twenty-first to twenty-third, twenty-seventh, and one-hundredth to one-hundred-and-third. All the others have some unpaired. The temporals usually are one followed by one. Variation in other scale-characters is shown in the following table:

TABLE OF SCALE COUNTS, *Dromicus dorsalis* (Steindachner)
JAMES ISLAND

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal
12091	♂	19	217	91 +	1	2	1+1	8	1
12092	♂	19	215	104 +	1	2	{1+1 / 1+2	8	1
12094	♂	19	213	68 +	1	2	1+1	8	1
12154	♂	19	213	72 +	1	2	{1+1 / 1+2	8	1
12155	♂	19	213	101 c	1	2	1+1	8	1
10782	♀	19	226	74 +	1	2	{1+1 / 1+2	8	1
12093	♀	19	221	85 +	1	2	{1+1 / 1+2	8	1
12153	♀	19	220	94 +	1	2	{1+1 / 1+2	8	1

All the specimens are striped. The stripes are clear and distinct except in Nos. 12093, 12094 and 12154, in which they are more or less obsolete behind the neck. They are continued to the parietals, and usually involve the scales of three rows.

Jervis Island.—Two specimens from Jervis seem to agree perfectly in squamation and coloring with the James Island snakes.

TABLE OF SCALE COUNTS, *Dromicus dorsalis* (Steindachner)
JERVIS ISLAND

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal
10610	♂	19	220	95 +	1	2	1+1, 1+2	8	1
10611	♀	19	226	81 +	1	2	1+1	8	1

Barrington Island.—I have before me fifteen snakes from Barrington. All but four of these have a few urosteges undivided. The variation in important scale-characters is set forth below. The tendency toward a reduction in the number of temporals and postoculars will be noted.

TABLE OF SCALE COUNTS, *Dromicus dorsalis* (Steindachner)
BARRINGTON ISLAND

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal
10147	♂	19	223	86 +	1	2	1+1	8	1
10152	♂	19	220	95 c	1	2	1+3	8	1
10182	♂	19	218	41 +	1	2	1+3	8	1
10183	♂	19	218	98 +	1	2	1+1	8	1
10215	♂	19	218	52 +	1	2	1+1	8	1
10217	♂	19	222	104 c	1	2	1+1	8	1
10226	♂	19	219	56 +	1	1–2	1+1	8	1
12061	♂	19	215	87 +	1	1–2	1+1, 1+3	8	1
10150	♀	19	227	81 +	1	1–2	1+1	8	1
10151	♀	19	229	86 +	1	1–2	1+1	8	1
10213	♀	19	223	86 +	1	2	1+3	8	1
10214	♀	19	229	61 +	1	1–2	1+3	8	1
10216	♀	19	226	65 +	1	2	1+1	8	1
12055	♀	19	223	73 +	1	2	1+1	8	1
12060	♀	19	227	76 +	1	2	1+1	8	1
Brit. Mus.	♂	..	224	......	..	..	....	..	..

Two styles of coloration are exhibited by the snakes of Barrington. Seven specimens (Nos. 10151, 10152, 10183, 10213, 10214, 10217, 10226) are striped, while eight (Nos. 10147, 10150, 10182, 10215, 10216, 12055, 12060, 12061) are spotted. The difference here, as on Indefatigable, is due neither to age nor sex. It must be regarded as a form of dichromatism. In the spotted specimens, the longitudinal light stripes are represented only by a pair of short longitudinal yellowish-white blotches on the nape. In striped specimens, the light stripes are confined to the scales of two rows. In all specimens, the light nuchal blotches or the longitudinal stripes end anteriorly sharply and definitely several scales behind the parietals. In all spotted specimens, the dark brown spots or blotches become obsolete posteriorly; while, in all striped specimens, the light bands extend to the tail.

General Remarks.—It is probable that larger series may result in the recognition of subspecies of *Dromicus dorsalis*. Even now the peculiarities of coloration, with the frequent reduction in temporals and postoculars, almost justify the separation of the Barrington Island snakes. The serpents of Indefatigable and Seymour appear to differ from those of the other islands in the possession of a greater number of urosteges, but so many of the specimens have lost the tips of their tails that more evidence is needed. Inconstant as the differences may prove to be, I believe that the following tentative key may prove useful to future investigators.

a.—Stripes or nuchal blotches ending definitely several scales behind parietals; stripes narrow.
Temporals usually 1+1; postoculars often 1; urosteges fewer.
Barrington.
a.[2]—Stripes or nuchal blotches usually continued forward to parietals; stripes wider.
b.—Urosteges more numerous; temporals usually 1+2; spotted or striped.
Indefatigable and Seymour.
b.[2]—Urosteges fewer; temporals usually 1+1; striped.
James and Jervis.

We do not know why so many of these snakes have lost the tips of their tails, but Mr. Slevin reports that the mockingbirds were observed picking at the tails of *Tropiduri* until they fell off and could be eaten.

Dromicus occidentalis, new species. NARBOROUGH ISLAND SNAKE

1903, *Dromicus biserialis biserialis* HELLER, Proc. Washington Acad. Sci., V, 1903, p. 93 (part).

Diagnosis.—Scale-pits present; scales in 19 rows; gastrosteges 236 to 252; postoculars two; temporals 1+1 or 1+2; striped (or rarely spotted), light nuchal blotches and series of dark spots on tips of gastrosteges and on lower lateral scales very distinct.

Type.—Adult female. California Academy of Sciences No. 11488. **Narborough Island, Galapagos Archipelago.** J. R. Slevin. April 18, 1906.

Distribution.—Narborough Island, Galapagos Archipelago.

Material.—Mr. Heller has recorded four snakes from Narborough, now forming a part of the collection of Stanford University, where I have examined them. The Academy has received only two from Narborough.

Description of the type.—Head rather broad, with flattened top and rounded snout. Rostral plate large, much broader than high, hollowed below, and bounded behind by internasal, anterior nasal, and first labial plates. Plates on top of head are: a pair of internasals, a pair of prefrontals, supraocular and part of preocular of each side, a frontal, and a pair of large parietals. Internasals much smaller than prefrontals. Frontal longer than parietal suture. Anterior and posterior nasal distinct. Loreal well developed, longer than high. One preocular. Two postoculars. Temporals one followed by two, or one followed by one. Eight superior and ten inferior labials, sixth upper and fifth or sixth lower largest, fourth and fifth upper reaching eye, first pair of lower meeting on median line. Genials in two pairs, posterior a little longer, anterior touching four labials. Scales on body smooth, many with pits, in nineteen rows. Anal plate divided. Gastrosteges two hundred and forty-seven. Tail incomplete. Urosteges ninety-eight, all paired.

The top of the head is dark brown mottled with olive gray. A light brown band extends from the rostral plate to the eye, and a dark brown postocular blotch crosses the temporal region to the side of the neck. The labials and lower surfaces of the head and throat are olive gray marbled with dark brown. On each side of the body there is a light yellowish-gray longitudinal stripe along the sixth and seventh rows of scales. On the posterior portion of the body, where there are only seventeen rows of scales, this stripe drops to the fifth and sixth rows. It is continued beyond the middle of the tail; but on the neck, as far as the twenty-fifth gastrostege, it is represented by a series of nine large, rounded, light spots. Along the back between these light stripes is a band of dark brown, darker on the scales bordering the light stripes. The sides are dark brown close to the lateral light stripes, but become grayish olive toward the gastrosteges. On the anterior half of the body, most of the scales of the second row, and a few of those of the first, bear central spots of dark brown. Similar small blackish-brown spots on the tip of each gastrostege form a row extending nearly to the tail. The lower surfaces are yellowish with numerous small blackish spots.

Length to anus, 890 mm.
Length of tail, 252 mm.

Variation.—No. 11509 has the first eleven urosteges undivided. These scales are all paired in all of the other specimens except No. 4974 of the Stanford University collection, in which the first urostege is unpaired. The following table shows the principal variation in squamation.

TABLE OF SCALE COUNTS, *Dromicus occidentalis*, new species.

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal
11509	♂	19	237	56 +	1	2	1+1 2+2	8	1
11488	♀	19	247	98 +	1	2	1+1 2+2	8	1
S.4974	♂	19	239	116 c	1	2	1+2	8	1
S.4975	♂	19	236	112 c	1	2	1+2	8	1
S.4973	♀	19	252	91 +	1	2	1+1 1+2	8	1
S.4976	♀	19	243	109 c	1	2	1+2	8	1

All the Narborough specimens have the characteristic light nuchal blotches and dark spots on gastrosteges and lower lateral scales. The dark spots on the lower laterals are most numerous on the scales of the first row in all specimens except the type. The row of spots along the tips of the gastrosteges extends to the vent in No. S. 4975 and S. 4976, nearly to the vent in No. S. 4974, and past the middle of the body in No. S. 4973. All the specimens show the longitudinal light stripes except No. S. 4975, which is spotted without any trace of stripes. The general dorsal coloration of this specimen is similar to that of the snakes of Albemarle and Brattle, but it shows the light blotches on the nape, and dark spots on gastrosteges and laterals, which are characteristic of the Narborough snakes. No. 11509 is intermediate in coloration between No. S. 4975 and the other Narborough specimens. It shows both stripes and spots most distinctly.

General remarks.—The snakes of Narborough agree with those of Albemarle and Brattle in the large number of their gastrosteges, a character which distinguishes them from all other Galapagos snakes. They seem to differ from those of Albemarle and Brattle only in coloration; and, since two specimens show a tendency to vary in the direction of the Albemarle form, it seems best to regard those from Albemarle as a subspecies.

Dromicus occidentalis helleri, new subspecies. HELLER'S GALAPAGOS SNAKE

1903, *Dromicus biserialis biserialis* HELLER, Proc. Washington Acad. Sci., V, 1903, p. 93 (part).

Diagnosis.—Scale-pits present, scales in 19 rows; gastrosteges more than 236; postoculars two; temporals 1+2 or 2+2, spotted, no longitudinal light stripes; no series of definite rounded blackish spots on lateral scales of first and second rows; light nuchal markings much less prominent, and dark spots on tips of gastrosteges absent or less distinct than in the Narborough form.

Type.—Male. California Academy of Sciences No. 10280. **Brattle Island, Galapagos Archipelago.** J. R. Slevin. October 30, 1905.

Distribution.—Albemarle and Brattle Islands, Galapagos Archipelago.

Material.—Mr. Heller has recorded one specimen from near Cape Berkeley, Albemarle, which now is No. 4977 of the Stanford University collection. The Academy has received two from Brattle.

Description of the type.—Head rather broad, with flattened top and rounded snout. Rostral plate large, much broader than high, hollowed below, and bounded behind by internasal, anterior nasal, and first labial plates. Plates on top of head are: a pair of internasals, a pair of prefrontals, supraocular and part of preocular of each side, a frontal, and a pair of large parietals. Internasals smaller than prefrontals. Frontal longer than parietal suture. Anterior and posterior nasals distinct. Loreal well developed, little longer than high. One preocular. Two postoculars. Temporals one followed by two. Eight superior and ten inferior labials, sixth upper and fifth lower largest, fourth and fifth upper reaching eye, first pair of lower meeting on median line. Genials in two pairs, posterior longer, anterior touching four or five labials. Scales on body smooth, many with pits, in nineteen rows. Anal plate divided. Gastrosteges two hundred and forty. Tail complete. Urosteges one hundred and twelve, the first to third, seventh to eleventh, and fourteenth and fifteenth not divided.

The top of the head is olive brown dotted with olive gray. A light brown band extends from the rostral plate to the eye, and a brown postocular blotch crosses the temporal region to the side of the neck. The labials and lower surfaces of the head and throat are yellowish-gray marbled with dark gray. There are no light longitudinal stripes on the body. The color above shades from brownish olive along the middle of the back to pale olive gray near the gastrosteges. On the neck are large round dark brown spots separated by light yellowish-gray blotches. On the anterior part of the body these dark spots become smaller and more numerous, and form three alternating rows on each side. These spots become smaller and less numerous posteriorly, and are lacking on the tail. They also tend to avoid the sixth and seventh rows of lateral scales. The lower surfaces are yellowish mottled with brownish gray except on the tail. Many of the tips of the gastrosteges bear not very definite small dark brown spots, but there is no series of such spots on the lower lateral scales.

Length to anus, 542 mm.
Length of tail, 178 mm.

Variation.—The Albemarle specimen has the upper postocular of one side united with the parietal. It has eight superior and ten inferior labials, the fourth and fifth upper reaching eye, the sixth in each series largest, five inferior in contact with the anterior genial. Both it and No. 10281, from Brattle, have all urosteges divided.

TABLE OF SCALE COUNTS, *Dromicus occidentalis helleri*, new sub-species

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal	Locality
10280	♂	19	240	112 c	1	2	1+2	8	1	Brattle
10281	♀	19	248	98 +	1	2	1+2	8	1	Brattle
S.4977	♀	19	241	88 +	1	1–2	{1+2, 2+2}	8	1	Albemarle

The two Brattle snakes are absolutely alike in coloration, and the Albemarle specimen is very similar, as will be seen from the following description of Stanford University No. 4977, adult female, from vic. Cape Berkeley, Albemarle Island.

The head is brownish olive marbled with black. There is a dark postocular or temporal streak. The labials are mottled with lighter. There are no longitudinal light lines. The upper surfaces are dark brown spotted with darker brown or black. On the neck, these spots are large, round and very distinct and well defined. On the body, they are smaller and become perhaps less distinct toward the tail. Still, they form, throughout the whole length of the body, two alternating rows usually on the fifth and eighth rows of scales of each side, dropping to the fourth and seventh rows posteriorly. There are two or three pairs of whitish blotches on the nape. The lower surfaces are yellowish irregularly spotted with brownish black. Almost every gastrostege on the anterior two-thirds of the body shows a definite blackish spot near its outer extremity on each side as in the Narborough snakes, but there are no similar spots on the first row of scales.

General remarks.—I take pleasure in naming this snake after Mr. Edmund Heller who collected the Albemarle specimen while a member of the Hopkins-Stanford Galapagos Expedition in 1898-99.

Dr. Boulenger writes me that the British Museum has a young spotted snake said to have been collected at Tagus Cove, Albemarle. It has one hundred and twelve urosteges, but only two hundred and twenty-two gastrosteges. This small number of gastrosteges makes me think that an error may have been made in the locality label. The specimen has scales with two pits, and one would incline to the opinion that it has originated on Barrington or Indefatigable. If, however, there has been no mistake in the label, the Tagus Cove snakes must represent a species distinct from that found at Banks Bay; and it may be that larger collections will show that each of the five large mountains of Albemarle has its own peculiar race of serpent.

Dromicus slevini, new species. Slevin's Snake

1903, *Dromicus biserialis biserialis,* Heller, Proc. Washington Acad. Sci., V, 1903, p. 93 (part).

Diagnosis.—No scale-pits; scales in 19 rows; gastrosteges 170 to 183; urosteges 82 to 104; no longitudinal light stripes.

Type.—Male. California Academy of Sciences No. 12,216. **Duncan Island, Galapagos Archipelago.** August 14, 1906.

Distribution.—Duncan, Narborough, and Cowley Mountain, Albemarle.

Material.—Three specimens are known. Two are in the Academy collection, while the one from Narborough belongs to Stanford University.

Description of the type.—Head rather broad, with flattened top and rounded snout. Rostral plate large, broader than high, hollowed below, and bounded behind by internasal, anterior nasal, and first labial plates. Plates on top of head are: a pair of internasals, a pair of prefrontals, supraocular and part of preocular of each side, a frontal, and a pair of large parietals. Internasals much smaller than prefrontals. Frontal slightly shorter than parietal suture. Anterior and posterior nasals distinct. Loreal well developed, longer than high. One preocular. Two postoculars. Temporals two followed by two, or one followed by one. Eight superior and ten inferior labials, sixth upper and sixth lower largest, fourth and fifth upper reaching eye, first pair of lower meeting on median line. Genials in two pairs, posterior a little longer, anterior touching five labials. Scales on body smooth, without pits, in nineteen rows. Anal plate divided. Gastrosteges one hundred and eighty-three. Tail complete. Urosteges one hundred and four, all paired except the first to fourth.

The head is brownish olive above, with whitish spots on the labials and a dark brown postocular streak. The back is crossed by about fifty-five black cross-bars separated by narrower brownish-white ones. In some places the black bars are not quite continuous, tending to alternate at the mid-dorsal line with those of the opposite side of the body. These black cross-bars extend down on the sides to about the second row of scales. The other lateral scales are of a brownish-gray color, continuous with the light cross-bars, and are sometimes outlined with black. The tail is provided with about thirty blackish-brown blotches proximally, becoming unicolor toward the tip where it is olive. The lower surfaces are grayish, more or less dotted with slate, and the base of each gastrostege shows a more or less concealed blackish cross-bar.

Length to anus, 228 mm.
Length of tail, 95 mm.

Variation.—The principal variation in scale characters is set forth in the following table.

TABLE OF SCALE COUNTS, *Dromicus slevini*, new species

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal	Locality
12216	♂	19	183	104 c	1	2–2	{ 2+2 1+1		1	Duncan
12159	♀	19	170	82 c	1	2–2	2+2	8	1	CowleyMt.
S.4972	♀	19	179	96 c	1	2–2	{ 2+2 2+3	8	1	Narborough

In all the specimens except the type all of the urosteges are divided, and the frontal is slightly longer than the parietal suture. Neither the Duncan nor the Cowley Mountain specimen shows any trace of longitudinal light stripes. Both are, in general, black with vertical light bars on the sides. In the Duncan snake most of these light bars cross the back; while in the Cowley specimen they do not extend above the lateral regions, leaving a black dorsal band three or four scales wide. The Narborough specimen agrees in coloration with that from Cowley Mountain. The Cowley specimen has about eighty-five light bars on the upper part of each side, where the Narborough snake has only seventy-one, and the Duncan about fifty-five. In the Cowley and Narborough snakes these light bars fork inferiorly and, joining with branches of the preceding and succeeding bars, outline alternating dark spots on the lower lateral scales.

The largest specimen of *D. slevini* is that from Cowley Mt., Albemarle Island, which measures 347 mm. from snout to anus, and 135 mm. from anus to tip of tail.

Habits.—The Duncan Island snake contains the foot and tail of a gecko which it had eaten.

General Remarks.—The Cowley Mountain snake was taken August 11, 1906, on a field of pumice stone at an elevation of about 200 feet. Mr. Slevin's notes state that it was the only snake secured on Albemarle, and differed in coloration from any taken elsewhere.

Under date of August 14, 1906, Mr. Slevin wrote: "Anchored off Duncan about ten A. M. I collected on the northeast slope of the island to about 800 feet. Got a snake at about 400 feet. It appeared different from any taken thus far. It was very well colored to prevent detection. It was secured on a lava block covered with silver colored lichen which matched the snake exactly. One was reported by Mr. Hunter during our last stop at Duncan, which, he said, was similar in coloring to the one taken today."

Mr. Drowne of the Webster-Harris Expedition reports[1] having seen on Duncan Island, September 9, 1897, a snake that was about one and a half feet long, slender and blackish, with white rings.

It is probable that more abundant material will show that more than one species has been included here under the name *Dromicus slevini.*

Dromicus steindachneri, new species. STEINDACHNER'S SNAKE

Diagnosis.—No scale-pits; scales in 19 rows; gastrosteges 169 to 180; urosteges 96 to 114; longitudinal light stripes present.

Type.—Male. California Academy of Sciences No. 10795. **Indefatigable Island, Galapagos Archipelago.** J. R. Slevin. Jan. 16, 1906.

Distribution.—This species has been found on Indefatigable, South Seymour and Jervis islands. It is probable that more

[1] Novitates Zool. VI, p. 117.

extensive collecting will show that it is present also on James and Barrington.

Material.—We have received five specimens. Two are from Jervis, two from South Seymour and one from Indefatigable.

Description of the type.—Head rather broad, with flattened top and rounded snout. Rostral plate large, broader than high, hollowed below, and bounded behind by internasal, anterior nasal, and first labial plates. Plates on top of head are: a pair of internasals, a pair of prefrontals, supraocular and part of preocular of each side, a frontal, and a pair of large parietals. Internasals much smaller than prefrontals. Frontal slightly longer than parietal suture. Anterior and posterior nasals distinct. Loreal well developed, longer than high. One preocular. Two postoculars. Temporals two followed by two, or one followed by one. Eight superior and ten inferior labials, sixth upper and sixth lower largest, fourth and fifth upper reaching eye, first pair of lower meeting on median line. Genials in two pairs, posterior a little longer, anterior touching five labials. Scales on body smooth, without pits, in nineteen rows. Anal plate divided. Gastrosteges one hundred and sixty-nine. Tail complete. Urosteges ninety-six, all paired.

The head is brownish olive above. There is a dark brown postocular streak. The labials and most of the other scales on the side of the head are yellowish gray with dark borders. The general color above is blackish brown. A light yellowish-gray stripe runs along each side of the neck, body, and tail. This streak is on the scales of the sixth, seventh, and eighth rows on the neck, and of the fifth, sixth, seventh and sometimes eighth on the body, except posteriorly where it drops to the fourth, fifth, and sixth rows. Many of the lateral scales have light central spots of the same color as the longitudinal stripes. The lower surfaces are light yellowish gray. There is a blackish cross-bar at the base of each gastrostege, and usually a blackish blotch on each side of the center of each gastrostege. The urosteges are light gray outlined with blackish brown.

Length to anus, 290 mm.
Length of tail, 130 mm.

Variation.—The principal variation in scale-characters is set forth in the following table. It will be noted that the Jervis and South Seymour snakes have three postoculars, while the Indefatigable specimen has only two.

TABLE OF SCALE COUNTS, *Dromicus steindachneri*, new species

Number	Sex	Scale rows	Gastrosteges	Urosteges	Preoculars	Postoculars	Temporals	Supralabials	Loreal	Locality
10612	♂	19	180	114 c	1	3–3	$\begin{cases}2+2\\2+3\end{cases}$	8	1	Jervis
10617	♀	19	176	97 c	1	3–3	2+2	8	1	Jervis
10795	♂	19	169	96 c	1	2–2	$\begin{cases}2+2\\1+1\end{cases}$	8	1	Indefatig-able
10482	♀	19	176	72 +	1	3–3	2+2	8	1	Seymour
10484	♀	19	176	58 +	1	3–3	$\begin{cases}2+2\\2+3\end{cases}$	8	1	Seymour

The Jervis, Seymour and Indefatigable specimens all have light longitudinal stripes. The stripes are similar in position and color to those of *Dromicus dorsalis*. The whole coloration is so like that of striped specimens of *D. dorsalis* that the two species readily pass as one, until the scales are examined and the gastrosteges counted. On closer examination, however, one notes that in *D. steindachneri* the longitudinal light lines are broader, being three or four scales wide, each of the lateral scales has a central light area, and there usually is a blackish cross-bar at the base of each gastrostege, and often a blackish blotch on each side of the center of each gastrostege. The dorsal scales also sometimes have light centers. In the Jervis specimens the lower lateral scales are nearly as light as the light stripe. In No. 10617 a dark brown line runs along the lower border of the light stripe.

The largest specimen measures 365 mm. from snout to vent.

Habits.—From the stomach of No. 10484 from South Seymour were taken the remains of a grasshopper.

General remarks.—This interesting little snake is most closely related to *Dromicus slevini*. It is probable that both are either quite rare or very retiring in habits.

It is a pleasure to associate with this handsome little species the name of Dr. Franz Steindachner, who was among the first to study the snakes of the Galapagos Archipelago.

Hydrus platurus (Linnæus). Bicolor Sea-Snake

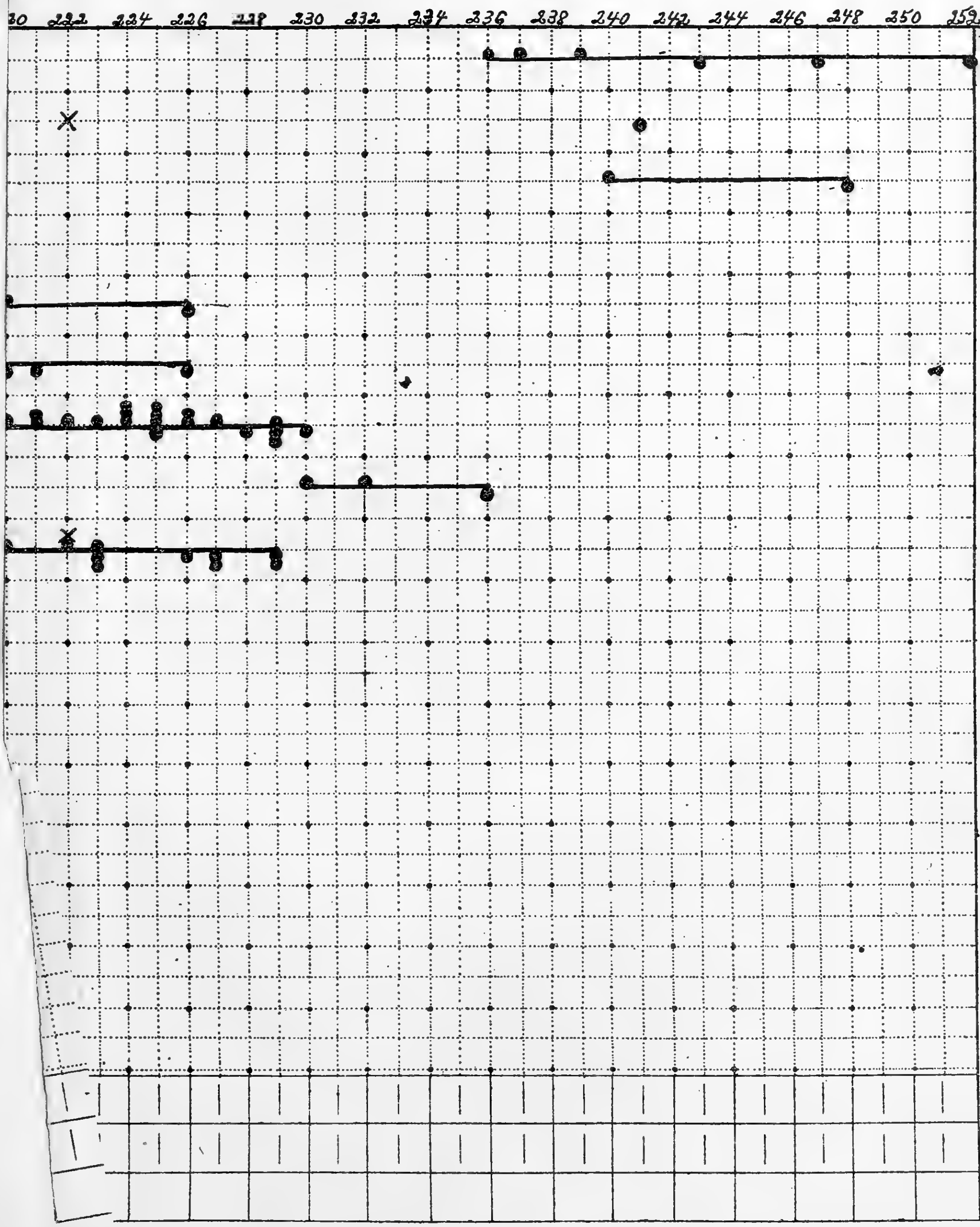
No specimens of this snake have been taken in the Galapagos Archipelago, but the following note from Mr. Slevin's diary shows that it occurs there.

"Feb. 24, 1906. Sailed [from Chatham] for Hood Island. This afternoon at 4:15, Stewart sighted a sea-snake. King also saw it, and the boat was put out immediately, but we failed to get it, as it went under. King said it was about twenty inches long, black on the top and bright yellow below. We had some headway on, so passed it fairly quickly. This is the first one seen. Weather is very hot now and has been for the last few days. Light winds and strong currents make it hard to get around, and we have not made much progress during the day. Barrington, Chatham, Hood and Charles are in sight."

January 15, 1912

EXPLANATION OF PLATE XXII

Chart of the gastrostege counts in specimens of *Dromicus*. Dots indicate counts on specimens in the Academy and Stanford collections. Dots above the line are males, those below, females. Crosses indicate records from specimens not examined by me.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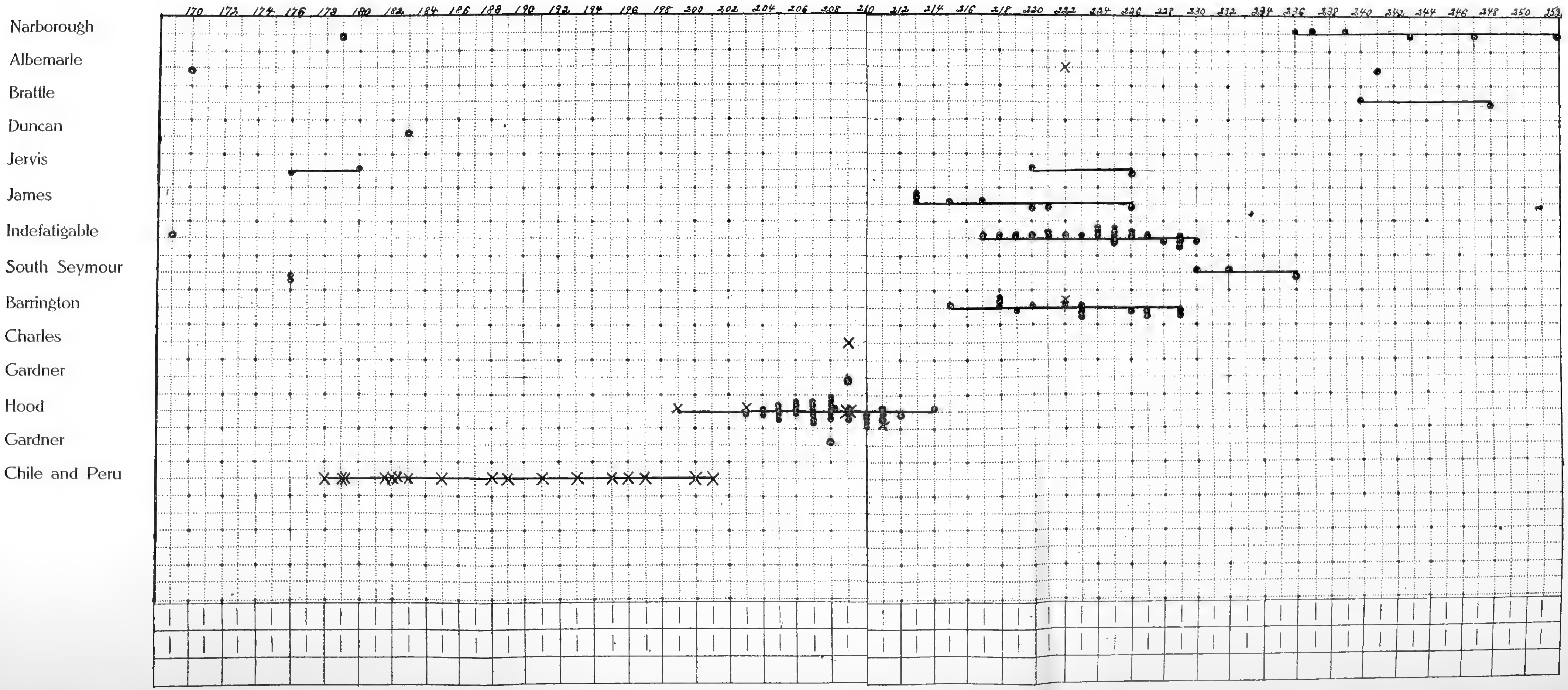
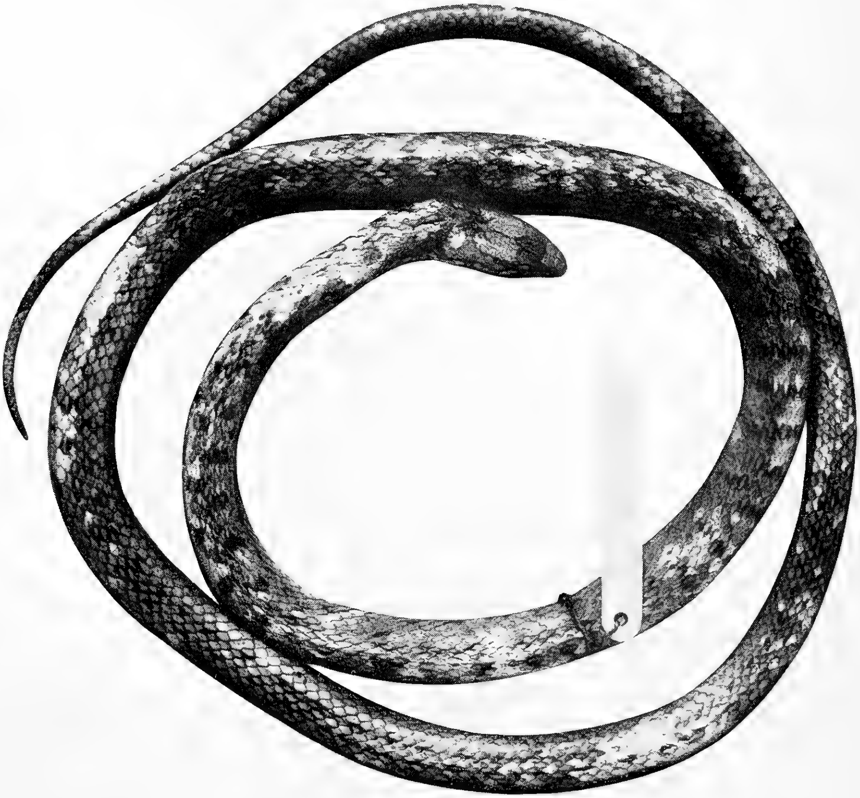

170 172 174 176 178 180 182 184 186 188 190 192 194 196 198 200 202 204 206 208 210 212 214 216 218 220 222 224 226 228 230 232 234 236 238 240 242 244 246 248 250 252
Narborough
Albemarle
Brattle
Duncan
Jervis
James
Indefatigable
South Seymour
Barrington
Charles
Gardner
Hood
Gardner
Chile and Peru

EXPLANATION OF PLATE XXIII

Dromicus biserialis (Günther).

No. 9448. Gardner Island, near Charles Island. Female.



EXPLANATION OF PLATE XXIV

Dromicus hoodensis new species

No. 11799. Type. Hood Island. Male.


HOOD ISLAND
23 1908

EXPLANATION OF PLATE XXV

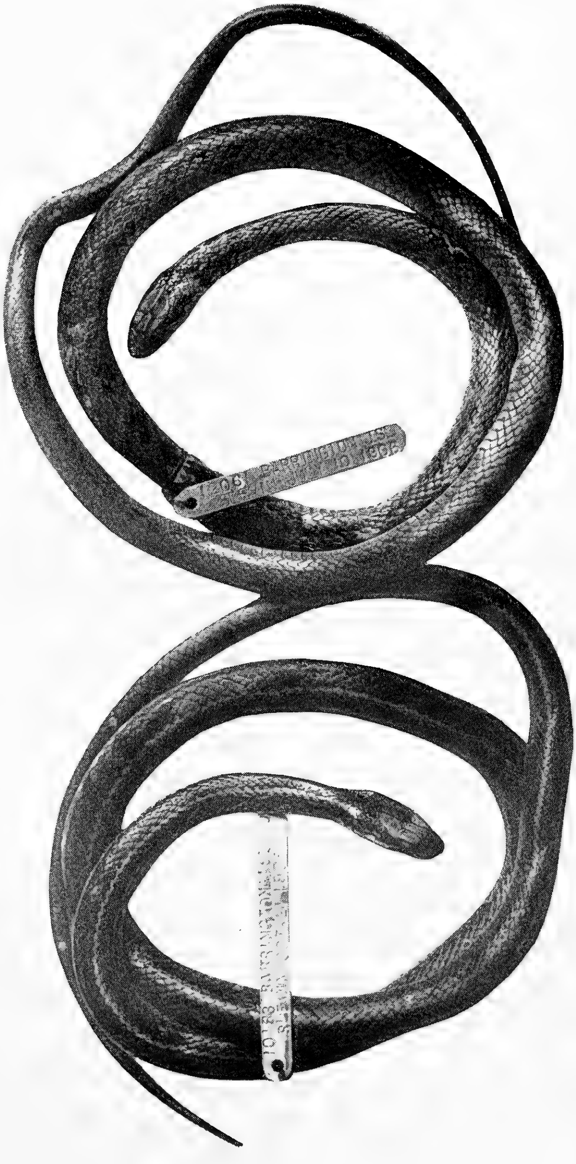
Dromicus dorsalis (Steindachner)

No. 10303. Indefatigable Island. Male. Striped.
No. 10233. Indefatigable Island. Female. Spotted.

EXPLANATION OF PLATE XXVI

Dromicus dorsalis (Steindachner)

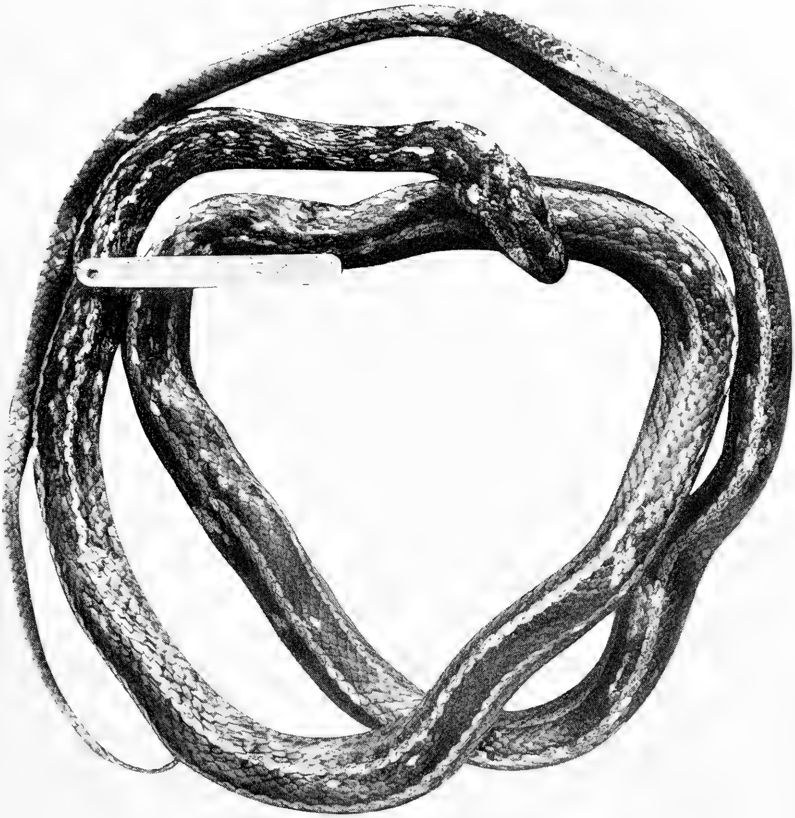
No. 10183. Barrington Island. Male. Striped.
No. 12061. Barrington Island. Male. Spotted.



EXPLANATION OF PLATE XXVII

Dromicus occidentalis new species

No. 11488. Type. Narborough Island. Female.



EXPLANATION OF PLATE XXVIII

Dromicus occidentalis helleri new subspecies

No. 10280. Type. Brattle Island. Male.

EXPLANATION OF PLATE XXIX

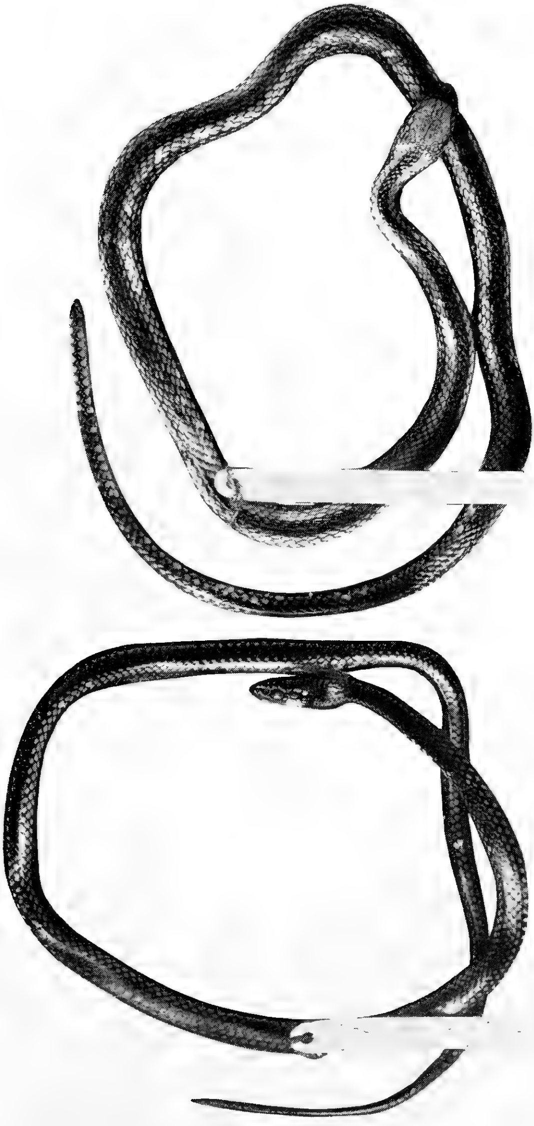
Dromicus slevini new species

No. 12216. Type. Duncan Island. Male.
No. 12159. Cowley Mt., Albemarle Island. Female.

EXPLANATION OF PLATE XXX

Dromicus steindachneri new species

No. 10795. Type. Indefatigable Island. Male.
No. 10484. South Seymour Island. Female.



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V

Notes on the Botany of Cocos Island

BY

ALBAN STEWART

Botanist to the Galapagos Expedition

SAN FRANCISCO

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EXPEDITION OF THE CALIFORNIA ACADEMY OF SCIENCES TO THE GALAPAGOS ISLANDS, 1905-1906

V.

NOTES ON THE BOTANY OF COCOS ISLAND

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During the autumn of 1905, while acting as Botanist of the scientific expedition sent to the Galapagos Islands by the California Academy of Sciences, our party stopped at Cocos Island from September 3rd to 13th inclusive, during which time a considerable collection of plants was made.

Owing to the fact that Dr. B. L. Robinson of the Gray Herbarium, and Professor H. Pittier of the United States Department of Agriculture, have a catalogue of the plants of this island in preparation, in which all of the scattered references to its flora will be brought together, the present paper will deal mainly with the collection of plants and notes made by the author, so as not to infringe upon the work already done by these gentlemen.

The collection was identified at the Gray Herbarium of Harvard University some three years ago, but owing to the more pressing need of getting the results of the work done in the Galapagos Islands ready for publication, the author has not been able to take up the less important results of the expedition until the present time. The work of identification was greatly facilitated through the kindness of Dr. Robinson in allowing me to use the list of plants already compiled by him. I wish here to express my thanks to Dr. Robinson for this, as well as for his kindness in allowing me to publish his description of *Cecropia Pittieri,* a new species of this genus which occurs abundantly on this island. I wish also to acknowledge my indebtedness to Dr. W. G. Farlow for identification of the mosses; to Professor M. L. Fernald for much assistance; to Miss Mary A. Day, Librarian of the Gray Herbarium, for help in looking up the literature in connection with the subject; and to Mr. H. H. Bartlett of the United States Department of Agriculture, for identifying the specimens of *Hypolytrum nicaraguense.* The photographs were made by Messrs. R. H. Beck and E. W. Gifford, members of the expedition.

Cocos is a small island which lies in longitude 86° 59′ 17″ W., latitude 5° 32′ 57″ N., and is about 300 miles distant from Costa Rica, to which country the island belongs. According to the chart issued by the Hydrographic Office, it is about 3½ miles long in a north and south direction, 3⅜ miles broad east and west, and rises to a height of 2788 feet. There are several small islets a short distance off shore, beyond which the water rapidly deepens, so that the thousand-fathom line is reached only a short distance away.

There are only two places where an anchorage can be effected, and the interior of the island can be reached with safety. Chatham Bay, which lies on the north side, affords the best anchorage for vessels; since the waters are more quiet on this side of the island, and the sand beach at the end of the bay affords a good landing-place for boats. A small stream of water enters at the head of the bay, and, from the different dates cut in the rocks about the mouth of this stream, one would judge that it was often visited by vessels during the early part of the last century. On either side of this bay, east and west, there are tall cliffs heavily covered with tropical vegetation. Wafer Bay, on the northwest side of the island, is more exposed, and is subject at times to heavy swells which render anchorage less safe there than in Chatham Bay. With the exception of these two places and Dampier Head, on the southeast side of the island, the remainder of the shore is made up of tall cliffs, some of which must be a thousand or more feet in height, over the tops of which numerous waterfalls come tumbling down into the sea. Ten of these waterfalls were counted between Lionel Head and Berthaume Point, within a distance of less than a mile, while circumnavigating the island in a small boat.

The settlement is located at Wafer Bay, where Captain August Gissler resides with his wife and a number of laborers. Several corrugated iron houses have been built there, and a small tract of land has been put under cultivation, in which a considerable number of domesticated plants and tropical fruits are grown. For some years past Captain Gissler has been in search of treasure which is supposed to have been buried on this island during the early part of the last century. Some portions of the treasure are reported to have been found. Captain Gissler is the duly appointed governor of the island, and is visited periodically by the Costa Rican gunboat to bring supplies and mail; but as the island lies out of the general track of both sailing vessels and steamers, it is seldom visited by other vessels. At the time of our visit the gunboat had not been out for some months, and in consequence some of the supplies had begun to run low.

The sides of the mountain rise abruptly to a cone, which lies toward the west side of the island, about a mile and three-quarters from the settlement at Wafer Bay. Alternating ridges and deep canyons cover the mountain sides, rendering traveling almost impossible except along the tops of the ridges and along the beds of streams. According to Captain Gissler, a single ridge can be followed from the base to the top of the mountain, the ridges probably representing ancient lava-flows. Unfortunately none of the members of the party visited the top of the mountain, although an attempt was made to do so by following up an old trail. The trail had been made several years before, and as it had not been much used since, it had become heavily overgrown with vegetation, and could not be followed beyond 650 feet elevation. We could get very little information about the interior of the island, especially about the eastern part of it, which has never been visited so far as is known. A fairly good view of this part of the island was obtained from the top of a cliff at Chatham Bay, and it appeared to be made up of a broad table-land heavily covered with vegetation, as are the remaining portions of the island.

Rock-exposures occur along the banks of streams and along the sides of perpendicular cliffs. So far as could be observed, the rocks are basaltic in character. Columns of basalt occur frequently near sea-level, and caverns of considerable depth have been formed in many places by the action of the waves. The soil is composed for the most part of a sticky yellow clay and vegetable mold. From the more exposed places the mold has been washed off, leaving the clay bare. On the steep sides of the mountain erosion is rapid. In the small valleys one often encounters large forest trees which have been dislodged from the steep hillsides above by the washing away of soil from the roots to such an extent that they could no longer maintain their position. Land-slides are rather frequent, and when they occur, large quantities of earth and boulders are brought down along with the vegetation which covers the area. After a land-slide *Ipomoea cathartica* seems to be one of the first plants to invade the denuded area, followed by *Hibiscus tiliaceus.*

The island lies in the moist tropical belt, and has a large amount of rainfall, the exact amount of which is not known, but it probably amounts to several feet per year. May, June, and July are said to be the rainiest months, and January, February, and March the driest. It rained eight out of the eleven days we were on the island, and some of the rains during this time were much harder than those which occur in more temperate regions. According to Captain Gissler the temperature ranges from 68° to 92° F.

Halophytic plants are very few in number, possibly because of the precipitous nature of the shores in most places. *Ipomoea Pes-caprae* is the most pronounced halophyte, and it occurs only to a limited extent on the sand beaches at Wafer Bay. *Hibiscus tiliaceus* forms small groves near the beach in a few places; and *Clusia rosea* often forms dense thickets along the sides of the cliffs some distance above the water, sending down absorbing roots into the sea. At several places near the shore there are small groves of *Cocos nucifera,* the nuts of which are used to make oil for lighting purposes when the gunboat from Costa Rica delays its periodic trips too long. There are no mangroves, possibly because of the absence of quiet bays and lagoons.

The interior of the island is covered for the most part with rain-forests, in which the vegetation is usually so dense that even at midday, with the sun shining, the light is almost as diffuse as at twilight. In such places there is an intense struggle among plants to gain the light—in consequence of which both epiphytes and lianes are very abundant in individuals, if not in species. The following list includes the species in the collection which are either epiphytes or lianes:

Anthurium scandens
Ipomoea cathartica
Lycopodium linifolium
Oleandra nodosa
Philodendron sp.
Selaginella Galeottii
Tassadia colubrina
Tillandsia sp.
Trichomanes capillaceum.

In addition to the above, there are several lianes which are in a sterile condition, so that even their generic relations cannot be determined. One of these is the most important liane on the island, extending in rope-like masses from tree to tree, often supporting hanging baskets of *Tillandsias* and other epiphytes.

Unfortunately specimens of the large forest trees are but poorly represented in the collection, because of the fact that the most of the forest trees tower a hundred or more feet above the ground. Since the foliage is almost invariably at the top, specimens could not be obtained without cutting down the trees—which was too much of an undertaking. I used to look up longingly at the tops of these trees, wishing that I could obtain specimens; but I have since learned that it is the common experience of botanists to be unable to obtain specimens of the forest trees while collecting in tropical rain-forests.

Besides the trees of *Hibiscus* and *Clusia,* mentioned above, there is at least one species of *Cecropia* which commonly occurs along the faces of almost perpendicular cliffs, the roots being able to hold on to a mere crevice or shelf of rock, while the trunks grow up parallel with the wall of the cliff. There is also a species of palm which grows mostly above 400 feet elevation. Some specimens of this were collected lower down, but they are in a sterile condition. At least two species of *Ficus* occur here, one of which forms banyan trees of some size. The largest, and probably the most important tree from an economic standpoint, is one which bears the common name of "iron wood" according to Captain Gissler, who says that there are trees on the island so large that timbers 3×3×60 feet could be cut from them. The wood of this tree is dark brown in color and very hard.

Underneath the trees there is usually a dense growth of bushes, so thick in most places that traveling through them is extremely difficult. In fact we found that the easiest way to get into the interior of the island was to follow up the beds of the larger streams, and occasionally make short excursions off to the side. The most common bushes are; *Eugenia pacifica, Clidemia hirta, C. umbonata, Miconia dodecandra,* and *Clibadium acuminatum;* three of which belong to *Melastomaceae,* and are the most abundant. Ferns also occur abundantly, forming a very important element of the undergrowth. Extensive brakes are formed by *Nephrolepis biserrata,* especially where the large vegetation is more or less open. The moist banks along the sides of the streams are usually heavily covered with ferns, those which occur in such places being: *Adiantum petiolatum, Asplenium cristatum, Ceropteris calomelanos, Hymenophyllum* sp., *Polybotrya cervina, Polypodium aureum, Trichomanes crispum,* and *T. elegans. Alsophila armata* is the only tree-fern found on the island.

Filices are by far the largest family represented in the collection, twenty out of the seventy-seven species of vascular plants collected belonging to it. Of the remaining families of vascular plants there are none that contain more than five species, and the majority are represented by but one or two.

Endemic species are included in the following: *Chloris paniculata, Kyllinga nudiceps, Cecropia Pittieri, Eugenia pacifica, Ossæa macrophylla, Ardisia cuspidata, Bertiera angustifolia,* and *Clibadium acuminatum.*

On comparing the above with the number of endemic species found on the Galapagos Islands, one is at once struck with the small number of endemic species found on this island; and while the entire flora is not recorded in this paper, it is very likely that the number of species omitted is not large. It is of course unsafe to draw any very definite conclusions from incomplete data, yet it is safe to say that the per cent of endemic species on the Galapagos Islands is very much larger than on Cocos Island. It is interesting to note that but 8.69% of the species mentioned in this paper are endemic, while in the Galapagos Islands 40.9% are endemic. There is also an evident wide divergence in the total number of species found on the two, the Galapagos flora containing 682 species, while the Cocas flora very likely contains but little if at all over a hundred species.

The wide divergence between the flora of the Galapagos Islands and that of Cocos Island, has been mentioned by authors who have written on these floras in the past. The following is a list of the species found on Cocos Island which are also found on the Galapagos Islands:

Acrostichum aureum
Adiantum petiolatum
Asplenium cristatum
Asplenium myriophyllum
Dryopteris parasitica
Nephrolepis biserrata
Nephrolepis pectinata
Polypodium aureum
Polypodium lanceolatum
Polypodium Phyllitides
Polystichum adiantiforme
Digitaria sanguinalis
Eleusine indica
Paspalum conjugatum
Paspalum distichum
Setaria setosa
Commelina nudiflora
Fleurya aestuans

*Anona cherimolia**
Anona glabra
Caesalpina bonducella
Euphorbia pilulifera
*Ricinus communis**
Hibiscus tiliaceus
Ipomoea Bona-nox
Ipomoea Pes-caprae
*Coffea arabica**

From the above presentation it can be seen that the species common to the two groups of islands are for the most part those of rather wide distribution, and owing to the relatively small size of most of them, the general appearance and make-up of the two floras is but little influenced by them. The species which make up the bulk of the vegetation, especially the larger vegetation, are totally different on the two groups of islands—a fact which may have some significance.

In a paper written some years ago by Dr. George Baur,† an attempt was made to establish a former land-connection between the Galapagos Islands and the American continent, the connection presumably having been somewhere in the Mexican region. The improbability of such a connection has already been shown,‡ and it seems that the great difference in the floras of Cocos and the Galapagos islands strongly opposes Dr. Baur's view.

If there has ever been a land-mass connecting the Galapagos Islands with the mainland of North America, it must evidently have included the Cocos Island region, since its position is such that no considerable land-mass could have existed in this part of the ocean without including it. While the climatic conditions on the lower parts of the islands of the Galapagos group are entirely different from that of Cocos Island, being dry in one and moist in the other, the middle and upper portions of the higher islands of the Galapagos are moist, and capable, in places at least, of supporting fully as mesophytic vegetation as is Cocos—a fact which is evinced by the presence of eleven ferns common to the two. A former land-

* Probably introduced through cultivation into both the Galapagos Archipelago and Cocos Island.

† American Naturalist, v. 25, 310 (1991).

‡ Stewart. Proc. Calif. Acad. Sci. 4th Ser. v. 1, No. 2, pp. 233-239.

connection between the two groups of islands should have left a much larger number of species common to the two than is actually found.

The flora of Cocos, like that of the Galapagos Islands, is distinctly that of an oceanic island. The relatively large number of ferns, the much smaller number of species in the remaining families, and the total number of species found on the island lend support to this view. The flora is probably of much more recent origin than is that of the Galapagos Islands. While the island lies nearer to the mainland by nearly three hundred miles, where presumably the various agents that disseminate seeds would work to at least as good advantage as in the Galapagos Islands, yet the number of species represented is probably not more than one-sixth as great. It seems possible that the time that has elapsed since conditions on the island were suitable for the growth of higher vegetation has not been sufficient to stock the island by the slow process of seed dissemination, over considerable areas of water, with as many species as it is capable of supporting. The small number of endemic species on the island might also point to a relatively recent origin of its flora.

The following are the species collected on the island by the author:

FILICES

Acrostichum L.

A. aureum L. Sp. Pl. 1069 (1753): very abundant along the stream leading into Wafer Bay and on the hillsides up to 125 ft. It grows in large bunches 6-8 ft. high and with 30 or more fronds to a bunch, (No. 225). Further distr. general in tropical regions.

Adiantum L.

A. petiolatum Desv. Berl. Mag. V. 326 (1811): in crevices or rocks on the banks of the stream leading into Wafer Bay, (No. 226). Further distr. Mex., W. Ind., S. Am.

Alsophila R. Br.

A. armata (Sw.) Pr. Tent. 62 (1836). *Polypodium armatum* Sw. Prod. 134 (1788): very abundant on the banks of the streams and on the hillsides surrounding both Chatham and Wafer Bays. It forms trees 8-15 ft. in height, and is apparently the only tree-fern on the island, (No. 227). Further distr. Mex., W. Ind., S. Am.

Asplenium L.

A. cristatum Lam. Encycl. II. 310 (1786): common on wet rocks on the side of a perpendicular cliff near Chatham Bay, (No. 228). Further distr. Mex., W. Ind., S. Am., Old World.

Ceropteris Link.

C. calomelanos (L.) Und. Bull. Torr. Cl. XXIX. 632 (1902). *Acrostichum calomelanos* L. Sp. Pl. 1072 (1753): common on the sides of moist banks on the stream leading into Chatham Bay, (No. 230). Further distr. W. Ind., S. Am., Africa.

Dryopteris Adans.

D. parasitica (L.) O. Ktze. Rev. Gen. II. 811 (1891). *Polypodium parasiticum* L. Sp. Pl. 1090 (1753): abundant at 600 ft. The specimens are sterile and doubtful, (Nos. 231-32). Further distr. Mex., W. Ind., S. Am., Old World.

Elaphoglossum Schott.

E. apodum (Klf.) Schott, Gen. ad. t. 14 (1834). *Acrostichum apodum* Klf. Enum. 59 (1824): occasional specimens were found growing on rotten logs on the banks of the stream leading into Wafer Bay, (No. 229). Further distr. W. Ind., northern S. Am.

Hymenophyllum Sm.

H. sp: on the side of a wet perpendicular cliff near Wafer Bay. The specimen is sterile, (No. 233).

Nephrolepis Schott.

N. biserrata (Sw.) Schott, Gen. Fil. ad. t. 3 (1834). *Aspidium biserratum* Sw. Schrad. Jour. 1800. II. 32 (1801): one of the most abundant ferns on the island. It grows in great profusion on the hills surrounding Chatham Bay, in places forming dense brakes 6-8 ft. high. It is less abundant around Wafer Bay and apparently does not occur below 125 ft. (Nos. 234-37). Further distr. Mex., W. Ind., S. Am., Old World.

N. pectinata (Willd.) Schott, Gen. Fil. ad. t. 3 (1834). *Aspidium pectinatum* Willd. Sp. V. 223 (1810): abundant in vegetable mold in moist shady places, (No. 238). Further distr. Mex., W. Ind., S. Am., Old World.

Oleandra Cav.

O. nodosa (Willd.) Pr. Tent. 78 (1836). *Aspidium nodosum* Willd. Sp. V. 211 (1810): growing very abundantly on the trunks of trees see Plate XXXII, (No. 239). Further distr. Mex. (Cent. Am.), W. Ind., N. S. Am.

Polybotrya H. & B.

P. cervina (L.) Klf. Enum. 55 (1824). *Osmunda cervina* L. Sp. Pl. 1065 (1753): abundant in woodland and on the banks of the stream leading into Wafer Bay, (No. 240). Further distr. Mex., W. Ind., N. S. Am.

Polypodium L.

P. aureum L. Sp. Pl. 1087 (1753): common on the sides of moist banks near Chatham Bay, (No. 245). Widely distributed.

P. Phyllitides L. Sp. Pl. 1083 (1753): common, (Nos. 243-44). Further distr. S. U. S., Mex., W. Ind., S. Am.

Polystichum Roth.

P. adiantiforme (Forst,) J. Sm. Hist. Fil. 220 (1875). *Polypodium adiantiforme* Forst, Prod. 82 (1786). *Asplenium coriaceum* Sw. Syn. Fil. 57 (1806): specimens are sterile and doubtful, (Nos. 241-42). Further distr. W. Ind., S. Am., Old World.

Trichomanes L.

T. capillaceum L. Sp. Pl. 1099 (1753): fairly abundant on the trunks of trees at 600 ft. (No. 246). Further distr. Mex., W. Ind., S. Am.

T. crispum L. Sp. Pl. 1097 (1753): common on wet shady banks near Wafer Bay, (Nos. 247-49). Further distr. Mex., W. Ind., S. Am., Africa.

T. elegans Rich. Act. Soc. Hist. Nat. Paris, I. 114 (1792): rare on wet shady banks, (No. 251). Further distr. W. Ind., S. Am.

T. radicans Sw. Schrad. Jour. 1800, II. 97 (1801): occasional on rotten tree-trunks near Wafer Bay, (Nos. 252-54). Widely distributed in tropical regions.

Filices sp.: specimen is sterile and indeterminate, (No. 250).

LYCOPODIACEAE

Lycopodium L.

L. linifolium L. Sp. Pl. 1100 (1753): common on the trunks of trees and on the sides of moist banks below 600 ft. (Nos. 255-58). Further distr. Mex., W. Ind., S. Am.

Selaginella Beauv.

S. Galeottii Spring, Monog. Lycopod. 220 (1842-49): common on the banana trees in gardens at Wafer Bay, (No. 259). Further distr. Mex., N. S. Am.

GRAMINEAE

Chloris Sw.

C. paniculata Schribner, in Rob. Fl. Gal. Isl. Proc. Am. Acad. XXXVIII. No. 4, 262 (1902): grows abundantly on exposed rocky cliffs near the shore, and is also common on the small islets in the immediate vicinity of the main island, (No. 260). Endemic.

Digitaria Scop.

D. sanguinalis (L.) Scop. Fl. Carn. ed. II. 1, 52 (1772). *Panicum sanguinale* L. Sp. Pl. 57 (1753): in crevices of the rocks along the stream leading into Wafer Bay and in cultivated ground, (Nos. 261-62). Widely distributed.

Paspalum L.

P. conjugatum Berg. Act. Helv. VII. 129, t. 8 (1772): common in cultivated ground around Wafer Bay, (No. 263). Further distr. Mex., W. Ind., S. Am., Old World.

Setaria Beauv.

S. setosa (Sw.) Beauv. Agrost. 51 (1812). *Panicum setosum* Sw. Prod. 22 (1788): common in cultivated ground near Wafer Bay, (No. 264). Further distribution, tropical regions.

CYPERACEAE

Calyptocarya Nees.

C. longifolia (Rudg.) Kunth, Enum. II. 365 (1837). *Schoenus longifolius* Rudg. Pl. Gui. 14, t. 16 (1805). *Calyptocarya palmetto* Nees, Cyp. Bras. 195 (1842): abundant on the banks of the stream near Wafer Bay, (No. 265). Further distr. Panama, W. Ind., N. S. Am.

Cyperus L.

C. prolixus HBK. Nov. Gen. & Sp. I. 206 (1815): abundant in the low flat area near Wafer Bay. The specimen is immature and somewhat doubtful as to species, (No. 266). Further distr. Mex., N. S. Am.

C. sphactelatus Rottb. Descr. 26 (1786): in low ground near Wafer Bay, (Nos. 267-69). Further distr. W. Ind., N. S. Am.

Hypolytrum Rich.

H. nicaraguenses Liebm. in Vedinsk. Selsk. Skr. V. ii. 235 (1851): common in large bunches in woodland and on the banks of the stream leading into Wafer Bay. Also found around the top of the island at 2788 ft. according to Capt. Gissler, (Nos. 270-71). Further distr. Nicaragua.

Kyllinga Rottb.

K. nudiceps C. B. Clark, in Rob. Fl. Gal. Isl. Proc. Am. Acad. XXXVIII. 262 (1902): fairly common in crevices of the rocks on sides of cliffs, (No. 272). Endemic.

PALMAE

Cocos L.

C. nucifera L. Sp. Pl. 1188 (1753): very abundant at various places along the shores of the island. It is especially abundant at Dampier Head on the southeast side of the island. No specimens were taken for botanical purposes. Widely distributed.

Palmae sp.: an undetermined species of palm occurring quite abundantly on the hillsides above both Chatham and Wafer bays. It seems to be most abundant above 400 ft. (Nos. 273-74).

ARACEAE

Anthurium Schott.

A. scandens (Aubl.) Engl. in Mart. Fl. Bras. III. p. 2, 78 (1878-82). *Dracontium scandens* Aubl. Pl. Gui. II. 836 (1775): common on trees at 600 ft. (No. 279). Further distr. Cent. Am.

Philodendron Schott.

P. sp.: occasional, covering bushes and small trees on the banks of the stream near Wafer Bay. The specimens are sterile, (No. 280).

Spathophyllum Schott.

S. Wendlandii Schott, in Ostr. Bot. Zeitschr. VIII. 179 (1858): common in densely shaded places on the banks of streams near sea-level, occasional at 600 ft. (Nos. 275-78). Further distr. Cent. Am.

BROMELIACEAE

Tillandsia L.

T. sp.: very abundant on the trunks and branches of trees all over the island. The fruiting specimen is fragmentary, but seems to be close to *T. utriculata* L., differing in the broader leaves and the shorter pedicels of the flowers. 286-87. A specimen doubtfully labeled *Catopsis aloides* Bak. in the Gray Herbarium, which was collected on this island by Snodgrass & Heller of the Hopkins Stanford Expedition, is probably the same.

COMMELINACEAE

Commelina Plum.

C. nudiflora L. Sp. Pl. 41 (1753): common on the bank of a stream near Chatham Bay, (No. 288). Widely distributed in tropical regions.

PIPERACEAE

Peperomia R. & P.

P. nigropunctata Miq. Syst. Pip. 188 (1840): occasional on moist rotten logs, (No. 289). Further distr. Martinique Isl.

MORACEAE

Ficus L.

F. tecolutensis (Liebm.) Miq.? in Ann. Mus. Bot. Ludg. III. 299, n. 64 (1867). *Urostigma tecolutense* Liebm. K. Dansk. Vidinsk. series 5, II. 324, [reprint, 40 (1851)]: the specimen is sterile and doubtful as to species, (No. 290). Further distr. S. Mex.

F. sp.: a species of Ficus forming large banyan trees occurs on the sides of the hills above Chatham Bay. No specimens were secured of this species.

URTICACEAE

Cecropia L.

C. Pittieri Robinson, nov. sp. "arborea; ramis 3-4 cm. crassis cavis septatis; foliis orbicularibus magnis 5 dm. diametro peltatis breviter 10-lobatis supra sparse pilosis glabratis viridibus subtus albidis valde reticulatis nervis patente hirsutis; lobis brevibus latisque semiorbicularibus margine undulatis apice rotundatis vel breviter acuminatis sinubus rotundatis; petiolo 4 dm. longo 1 cm. diametro tereti albido-arachnoideo basi incrassato sordide hirsuto; stipulis oblongo-lanceolatis acutis 1.6 dm. longis 6 cm. latis utrinque hirsutis margine integerrima tenuiore glabriuscula excepta; spatheis masculis teretibus apice longissime attenuatis 1.4 dm. longis extus griseo-pubescentibus, pedunculo robusto 8 cm. longo; spicis masculis ca. 19 sessilibus 1 dm. longis 3 mm. crassis. A true characteristic of the lower region on the east and north coast of the island, alt. 10-150 m., Pittier, No. 16237 (hb. Gr.). This species like *C. peltata* is distinguished from most of its congeners by its shallowly lobed leaves, the sinuses penetrating only a fourth of the distance from the margin to the center of the leaf. From *C. peltata* L. of the West Indies and South America it differs as follows: Its petioles, instead of having a close tawny or at least sordid tomentum as in that species, are covered by a white deciduous arachnoid wool. The upper surface of the leaf is not at all scabrous, and the nerves beneath are very coarsely hirsute. The color of the lower surface of the leaf also is decidedly paler than in any specimen of *C. peltata* at hand. From *C. obtusa* it differs in the acumination of the middle leaf-lobes." The specimens secured on this island have younger leaves than the type specimen; (No. 291). Endemic.

Fleurya Gaud.

F. aestuans Gaud. in Freyc. Voy. Bot. 497 (1826): common in cultivated ground around Wafer Bay, (Nos. 292-93). Further distr. Mex., W. Ind., S. Am.

PHYTOLACCACEAE

Phytolacca L.

P. isocandra L. Sp. Pl. 631 (1753): occasional on the banks of the stream near Wafer Bay, (No. 294). Further distr. Mex., W. Ind., N. S. Am.

ANONACEAE

Anona L.

A. cherimolia Mill. Gard. Dict. ed. VIII. n. 5 (1768): trees in gardens and probably introduced, (No. 295). Further distr. Mex., W. Ind., S. Am.

A. glabra L. Sp. Pl. 537 (1753): a few low bushes of this species were found growing on the beach at Dampier Head. Further distr. S. U. S., W. Ind.

LEGUMINOSAE

Cassia L.

C. reticulata Willd. Enum. Hort. Berol. 443 (1809): forms occasional clumps of bushes 6-8 ft. high near the beach at Chatham Bay, (No. 296). Further distr. Mex., N. S. Am.

Caesalpinia L.

C. bonducella (L.) Fleming in As. Res. XI. 159 (1810). *Guilandina bonducella* L. Sp. Pl. ed. 2, 545 (1763): occasional bushes 6-8 ft. high near the beach at Wafer Bay (No. 297). Further distr. general in warm countries.

Desmodium Desv.

D. sp.: common at Wafer Bay and at Dampier Head. The specimens are sterile, (No. 298).

Leguminosaea sp.: a tendril-bearing vine, sterile and indeterminate, (No. 299).

EUPHORBIACEAE

Acalypha L.

A. bisetosa Bert. acc. to Spreng. Syst. III. 879 (1826): occasional bushes about 8 ft. high, (No. 300). Further distr. W. Ind., N. S. Am.

MALVACEAE

Hibiscus L.

H. tiliaceus L. Sp. Pl. 694 (1753): common trees near the shore and on the sides of the hills. The specimens found growing on the shore were usually low and spreading, while those on the hillsides were tall and straight. According to Capt. Gissler, the wood of this tree makes excellent paper pulp, and at the time our party visited the island, he was trying to interest parties in this in order to start a pulp-industry on the island, (Nos. 301-04). Widely distributed in tropical regions.

BOMBACEAE

Ochroma Sw.

O. lagopus Sw. Prod. 98 (1788). *Bombax pyramidale* Cav. Dis. V. t. 153 (1788): common trees, (No. 281). Further distr. Mex., W. Ind., S. Am.

HYPERICACEAE

Clusia L.

C. rosea Jacq. Enum. 34 (1760): grows very abundantly on the rocks above the sea, forming dense thickets of low trees. It often puts out numerous absorbing roots which extend down into the sea-water. It also occurs abundantly on both Conic and Nuez Islands, from the last of which the specimens were taken, (Nos. 282-83). Further distr. Panama, W. Ind., N. S. Am.

COMBRETACEAE

Terminalia L.

T. Catappa L. Mont. II. 519 (1771): a few large trees of this species occur on the flat area just back of the beach at Wafer Bay. It is probably introduced, (No. 331). Widely distributed.

MYRTACEAE

Eugenia L.

E. pacifica Benth. Bot. Sulph. 98 (1844): low bushes on the banks of streams, (No. 284). Endemic.

MELASTOMACEAE

Clidemia D. Don.

C. hirta (L.) D. Don. in Mem. Wernerian Soc. IV. 309 (1822). *Melastoma hirta* L. Sp. Pl. 390 (1753): common bushes and small trees in woodland at 600 ft. (No. 285). Further distr. Mex., W. Ind., S. Am.

C. umbonata Sch. & Mart. in DC. Prod. III. 158 (1828): common bushes in woodland, (No. 305). Further distr. N. S. Am.

Conostegia D. Don.

C. lasiopoda Benth. Bot. Sulph. 96 (1844): small trees, abundant, (No. 306). Endemic.

Miconia Ruiz. & Pav.

M. dodecandra (Desv.) Cogn. in Mart. Fl. Bras. XIV. pt. 4, 243 (1887). *Melastoma dodecandra* Desv. in Lam. Encyc. IV. 46 (1796): bushes abundant in woodland around Wafer Bay, (No. 307). Further distr. Mex., W. Ind., N. S. Am.

Ossaea DC.

O. macrophylla Cogn. D.C Mon. VII. 1064 (1891): small trees common at 600 ft. (No. 308). Endemic.

ONAGRACEAE

Jussieua L.

J. linifolia Vahl. Ecol. Am. II. 32 (1798): common among rocks on the side of a cliff near Chatham Bay, (No. 309). Widely distributed in tropical regions.

MYRSINACEAE

Ardisia Sw.

A. cuspidata Benth. Bot. Sulph. 123 (1844): occasional bushes (Nos. 310-12). Endemic.

A. humilis Vahl.? Symb. III. 40 (1794): occasional bushes at 600 ft. (No. 313). The specific identity of this specimen is doubtful, but it resembles fruiting specimens of this species in the Gray Herbarium. Further distr. East Indies.

Rapanea Aubl.

R. Guianensis Aubl. Pl. Gui. 121 (1775): bushes about 8 ft. high on the banks of the stream near Wafer Bay, (No. 320). Further distr. Mex., W. Ind., N. S. Am.

ASCLEPIADACEAE

Tassadia Decne.

T. Colubrina Decne. DC. Prod. VIII. 579 (1844): common at 650 ft. (No. 321). Further distr. Brazil.

CONVOLVULACEAE

Ipomoea L.

I. cathartica Poir. Dict. Supl. IV. 633 (1816): common on open hillsides, often covering the ground and vegetation with a dense mass of vines, (Nos. 322-23). Further distr. S. U. S., W. Ind., N. S. Am.

I. Pes-caprae (L.) Sweet, Hort. Sub. Lond. 35 (1818). *Convolvulus Pes-caprae* L. Sp. Pl. 159 (1753): common on the beach at Wafter Bay, (No. 324). Widely distributed on tropical shores.

RUBIACEAE

Bertiera Blum.

B. angustifolia Benth. Bot. Sulph. 103 (1844): bushes 6-8 ft. high at 300 ft. (No. 325). Endemic.

Coffea L.

C. arabica L. Sp. Pl. 172 (1753): evidently an introduced species. Widely distributed in tropical regions through cultivation.

Rustia Klotz.

R. occidentalis (Benth.) Hemsl. Biolog. Cent. Am. Bot. II. 14 (1881-82). *Exostemma occidentale* Benth. Bot. Sulph. 104 (1844): occasional bushes, (No. 315). Further distr. Cent. Am., N. S. Am.

Spermacoce L.

S. ocymoides Burm Fl. Ind. 34 (1768): common in open grassy places on the banks of the stream near Wafer Bay, (Nos. 316-17). Widely distributed in tropical regions.

VERBENACEAE

Cornutia L.

C. grandifolia (Ch. & Schl.) Schau. in DC. Prod. XI. 682 (1847). *Hosta grandifolia* Ch. & Sch. Linn. V. 97 (1830): bushes about 8 ft. high on the sides of cliffs and on the banks of the stream near Wafer Bay, (No. 318). Further distr. S. Mex.

COMPOSITAE

Blainvillea Cass.

B. biaristata DC. Prod. V. 492 (1836): common in cultivated ground, (No. 319). Further distr. Brazil.

Clibadium L.

C. acuminatum Benth. Bot. Sulph. 114 (1844): common bushes near Wafer Bay, (No. 326). Endemic.

Rolandra Rottb.

R. argentea Rottb. Coll. Havn. II. 258 (1775): common on the sides of the cliffs near Chatham Bay, (No. 327). Further distr. Panama, W. Ind., N. S. Am.

Wedelia Jacq.

W. paludosa DC. Prod. V. 538 (1836): very abundant in open places on the sides of the hills above Chatham Bay, sometimes covering the ground with a dense mass of vegetation 2-3 ft. high to the exclusion of almost all other plants. It also occurs to some extent at Wafer Bay, occasional specimens being seen at 600 ft. in this region, (No. 328). Further distr. Cent. Am., N. S. Am.

The following species of mosses occurring in the collection were identified by Dr. W. G. Farlow:

Pilotrichum bipinnatum (Sch.) Brid.
Hypnella pallescens (Hook) Jaej.
Syrrhopodon rigidus Hook. and Grev.
Octoblepharum albidum Hedw.
Rhyzogenium spiniforme (L.) Bruch.

The following vascular plants are mentioned by Robinson,* but were not included in the collection:

Acrostichum caudatum Hook.
Adiantum intermedium Sw.
Asplenium rhizophyllum Kunze
Dicksonia cicutaria Sw.
Polypodium chnoodes Spreng.
Polypodium lanceolatum L.
Trichomanes pyxidiferum L.
Lycopodium mollicomum Mart.
Selaginella stenophylla A. Br.
Eleusine indica Gaertn.
Paspalum distichum L.
Paspalum platycaule Poir.
Euphorbia pilulifera L.
Ricinus communis L.
Ipomoea Bona-nox L.

UNIVERSITY OF WISCONSIN,
July 6, 1911.

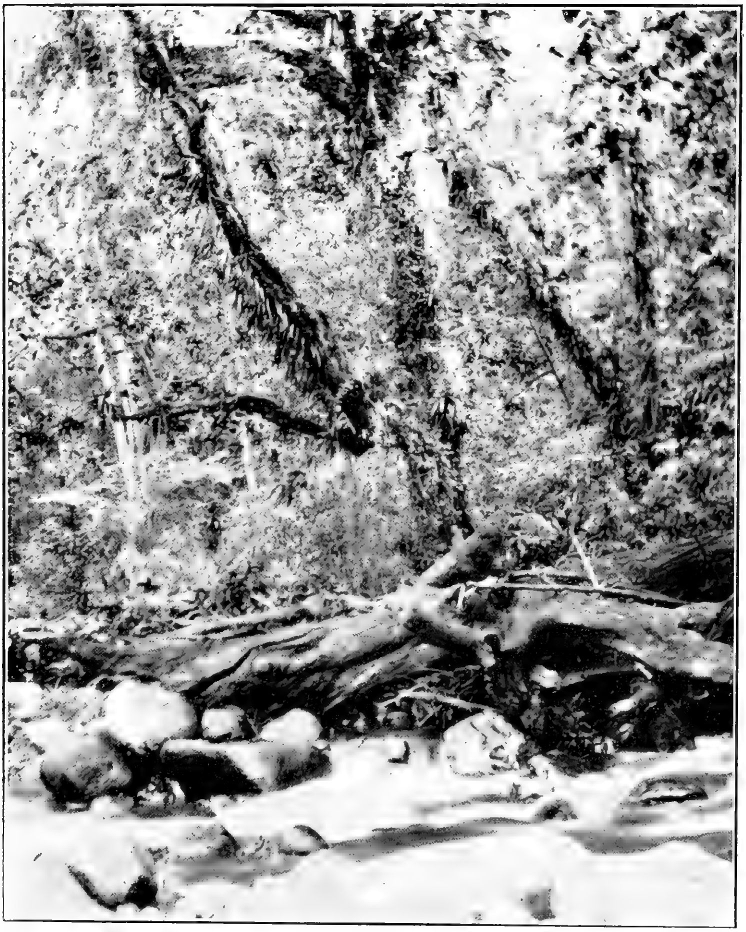
* Flora of the Galapagos Islands. Proceedings of the American Academy of Arts and Sciences, v. 38, No. 4, 241, 261-63 (1902).

EXPLANATION OF PLATE XXXI

An opening in the forest, showing *Alsophila armata* in the center and a dense growth of ferns and bushes.

EXPLANATION OF PLATE XXXII

Trees along the bank of the stream leading into Wafer Bay, heavily covered with epiphytes.



EXPLANATION OF PLATE XXXIII

Bushes and small palms near Wafer Bay.

EXPLANATION OF PLATE XXXIV

An opening at the edge of the rain-forest, showing a tree heavily covered with lianes.

PROCEEDINGS

Fourth Series

VOLUME I

Expedition of the California Academy of Sciences to the Galapagos Islands, 1905-1906.

VOLUME II

Expedition of the California Academy of Sciences to the Galapagos Islands, 1905-1906.

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The Academy cannot supply any of its publications issued before the year 1907, its entire reserve stock having been destroyed in the conflagration of April, 1906.

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The Geckos of the Galapagos Archipelago

BY

JOHN VAN DENBURGH

Curator of the Department of Herpetology

SAN FRANCISCO

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CONTENTS

April 12, 1912

Introduction

In a previous paper[1] I have given an account of the snakes of the Galapagos Archipelago, and have attempted to trace the history of these islands from the evidence afforded by this group of their inhabitants. The present article is based upon a similar investigation of the geckos of this region, undertaken with a view to confirming or disproving the conclusions reached in the earlier paper.

The tortoises and the lizards of the family *Iguanidae* are yet to be studied along the same lines.

Origin and Relationship of the Galapagos Geckos

Two genera of *Gekkonidae,* or the family of geckos, have been recorded as inhabitants of the Galapagos Archipelago. One of these, *Gonatodes,* has been found only by Dr. Baur, whose collection included four or more specimens labeled Wreck Bay, Chatham Island. No other collector has secured this lizard in the Galapagos, although most careful search has been made for it. It seems probable, therefore, that Dr. Baur's specimens either had been recently introduced with the effects of the colonists from the mainland, or were collected by Dr. Baur at Guayaquil and erroneously labeled. From the standpoint of zoögeography, however, the question is of little importance, for if this lizard be native to the archipelago it would merely afford one more bit of evidence of the close relationship of the Galapagoan to the South American fauna. Various species of *Gonatodes* have been reported from the West Indies, South America, Australia, the East Indies, and southern India.

The second genus, *Phyllodactylus,* has even a wider range in the tropical world. It has representatives in the Mediterranean region, South Africa, Madagascar and other islands in the Indian Ocean, southern Asia, Australia, Norfolk Island, the New Hebrides, western South America, Central America, Mexico, and the Antilles. In the Galapagos Archipelago it has been found on Wenman, Chatham, Hood, Gardner-near-

[1] Proc. Calif. Acad. Sci., 4th Ser. v. 1, (4) 1912.

Hood, Charles, Gardner-near-Charles, Enderby, Champion, Barrington, Duncan, Indefatigable, Daphne, James, Cowley, Albemarle, and Brattle islands.

Chatham is the only island upon which there occurs more than one species of *Phyllodactylus.* Here, two very distinct species have been found. One of these has been regarded as identical with *Phyllodactylus tuberculosus* of the North and South American continents. It has no close relatives on any of the other islands of the archipelago, and may have been introduced on Chatham since the plantation was established there.

The other Galapagoan geckos are all closely related. There can be little doubt that all are directly descended from a single species which formerly occupied this entire area. We must believe that the isolation resulting from the separation of an original large island into the various small islands which now exist, has made possible the differentiation which we now find in these geckos.

If this be true, we should expect to find that the greatest differentiation exists where isolation has been longest maintained, and, conversely, that separation has existed longest where the greatest differentiation is found. Thus we may proceed to sketch the history of the Galapagos Islands as indicated by the geckos of the genus *Phyllodactylus.*

Origin and History of the Galapagos Islands

Phyllodactylus gilberti has been found only on Wenman Island. It is the most distinct of all the Galapagoan geckos.[1] Hence, we may infer that Wenman Island has had an individual existence longer than any of the other gecko-bearing islands of the archipelago.

No geckos have ever been found on Culpepper, Abington, Bindloe or Tower Islands.

The next gecko in point of distinctness is *Phyllodactylus leei* of Chatham Island. This leads us to believe that Chatham became a separate island at a time when the other central and southern islands still were connected.

[1] Except *P. tuberculosus,* which we shall not consider farther.

There may be some difference of opinion as to whether *Phyllodactylus bauri* or *Phyllodactylus barringtonensis* is the more differentiated form. *P. barringtonensis* is intermediate between *P. leei* and *P. galapagoensis.* It agrees with *P. galapagoensis* in the number and arrangement of the postmental plates, but has tubercles only on that portion of the back which lies between the insertions of the hind limbs. *Phyllodactylus bauri,* on the other hand, has quite a different arrangement of the postmentals, which are reduced in number to two, and its dorsal tubercles have a distinctive distribution. On cursory examination, *P. bauri* resembles *P. galapagoensis* much more than *P. barringtonensis* does. Nevertheless, I believe that the differences found in *P. bauri,* involving as they do changes in arrangement as well as in number, are of greater import than the mere reduction in dorsal tubercles which characterizes *P. barringtonensis.* This view of the case leads to the conclusion that the islands occupied by *P. bauri*—namely, Hood and Charles—probably were the next to become separated in the breaking up of the original large island, and that the isolation of Barrington occured soon after.

Phyllodactylus bauri inhabits both Charles and Hood islands, with their outlying islets. Since we cannot believe that this species has been independently evolved in two separate islands, and do not think that it has been carried across the water from one island to the other, we are forced to conclude that Charles and Hood islands were connected, and formed parts of a single large southern island, for a considerable time after their separation from the rest of the land area which later became the present archipelago.

The relationship which exists between *Phyllodactylus barringtonensis* and *P. leei* perhaps may indicate that the last connection of Chatham with the central island was by way of Barrington Island.

The geckos of the remaining islands have undergone much less differentiation than those which we have thus far considered. For the present, we must refer them all to one species, *Phyllodactylus galapagoensis,* although it is quite possible that more abundant material might enable us to recognize differences which now are hidden. We have only the following specimens:

4	from	Indefatigable
8	"	Daphne
2	"	James
7	"	Cowley
2	"	Duncan
4	"	Brattle
5	"	Tagus Cove, Albemarle
2	"	Cowley Mt., Albemarle
10	"	Iguana Cove, Albemarle
43	"	southeastern Albemarle

Obviously, this series of specimens is insufficient to enable us to point out all the minor differences between the geckos of these islands; but it does suffice to permit us to say that all are closely related. From this we may conclude that these islands all remained connected, and formed a single island, for a long time after their separation from those islands already considered, where distinct species have been evolved.

While it is true that all these geckos from the central islands are so closely related, they are not all identical. Those of Duncan and Daphne islands differ sufficiently to enable us to recognize them as distinct subspecies; from which we may conclude that these two islands have had an independent insular existence longer than the others of the central group, which doubtless remained connected until a still later period.

Farther than this we cannot go, and it is evident that differentiation in the geckos of the Galapagos Islands has progressed neither so rapidly nor so far as it has in the case of the snakes of the archipelago. The older and more stable organization of these lizards has not changed so quickly. For this reason, the geckos throw but little light upon the more recent history of the islands. They, as it were, have not kept up to date. Their story stops before the separation of Charles Island from Hood, at a time when the central islands, excepting Duncan and Daphne, yet were one. But so far as it goes, the story of the geckos agrees completely with that of the snakes, except on one minor point. Our study of the snakes indicated that Barrington only recently became separated from Indefatigable Island. The evidence afforded by the geckos would lead us to place the separation of Barrington at a more remote period. In other respects there is complete agreement.

Systematic Account

Key to Galapagoan Species of Geckos

a.—Digits without dilated pads.
Gonatodes collaris.—p. 410.
a².—Digits dilated distally and furnished inferiorly with two large plates.
b.—Limbs with scattered enlarged tubercles.
Phyllodactylus tuberculosus.—p. 412.
b².—Limbs covered above with nearly uniform granules.
c.—No rows of enlarged dorsal tubercles on back between levels of fore and hind limbs.
d.—No enlarged dorsal tubercles between hind limbs.
Phyllodactylus leei.—p. 416.
d².—Enlarged dorsal tubercles present between hind limbs.
Phyllodactylus barringtonensis.—p. 418.
c².—Back with rows of enlarged tubercles between levels of fore and hind limbs.
dd.—Median series of subcaudals enlarged transversely; a median dorsal band of granules distinctly smaller than laterals and usually lighter in color; enlarged dorsal tubercles much smaller; rows less distinct and fewer than five on each side except on sacrum.
Phyllodactylus gilberti.—p. 413.
dd².—No median series of large subcaudals; no distinct mid-dorsal light band of smaller granules; dorsal rows of enlarged tubercles five or six on each side; very distinct.
e.—Tubercles in dorsal rows usually separated by at least their own length; postmentals two.
Phyllodactylus bauri.—p. 426.
e².—Tubercles in dorsal rows usually separated by less than their own length, or by not more than one small granule; postmentals usually more than two.
f.—Tubercles in upper dorsal rows set as closely as in other rows.
g.—Tubercles of some dorsal rows continued on neck anterior to insertion of fore limbs; snout shorter; dorsal rows of tubercles usually six on each side (rarely five).
Phyllodactylus galapagoensis.—p. 420.
g².—Tubercles of dorsal rows absent on neck anterior to insertion of fore limbs; snout longer; dorsal rows of tubercles five on each side.
Phyllodactylus g. daphnensis.—p. 425.
f².—Tubercles in upper dorsal rows set less closely, usually separated by two or more granules.
Phyllodactylus g. duncanensis.—p. 426.

Gonatodes collaris Garman.

Gonatodes collaris, Garman, Bull. Essex Inst., XXIV, 1892, p. 83 (type locality **Wreck Bay, Chatham Island**); Heller, Proc. Washington Acad. Sci., V, 1903, p. 60.

This gecko is know only from Garman's description based upon four specimens collected by Dr. George Baur, and labeled

Wreck Bay, Chatham Island. It has not been found by any other collector, although the members of our expedition searched carefully for it, and collected a hundred and sixty-nine geckos on Chatham Island. The fact that Dr. Baur secured four specimens indicates that the species was not very rare where he got it, and the failure of all other collectors to secure it in the Galapagos makes one wonder whether Dr. Baur's specimens might not have originated at Guayaquil, where he also collected, and have been in some way mislabeled.

I quote Dr. Garman's original description:

"Head moderate; snout obtusely pointed, longer than the distance between the eye and the ear opening, one and one-half times the diameter of the orbit, equal the width of the crown at the hinder edge of the orbit; forehead flat; ear-opening small. Digits slender; basal joint slender, subcylindrical, with larger plates beneath; other joints more slender, compressed. Head, throat, upper portions of body, limbs and tail covered with subequal granular scales, smallest on the occiput, larger on chin and tail. Rostral broader than high, pentagonal, incised on the top. A small internasal toward each side. Two small shields behind the nostril. Six labials; sixth small, slightly behind the middle of the eye. Five infralabials; posterior nearly reaching a vertical from the hinder border of the eye; first large, in contact with two submentals; mental large, with a median and two lateral angles posteriorly, in contact with a pair of moderate submentals, at each side of which there is one scarcely half as large, from which again a diminishing series of three or four passes back along the infralabials. Abdominal scales moderate, imbricate, heptagonal, flat, similar to scales in front of thighs and arms. Tail tapering, subround, covered with small imbricate scales above and larger ones beneath. The median row under the tail is subject to great variation: on two of the specimens the scales are about twice as broad as long; on two others they are so broad as to reach from side to side of the tail. The granules of the throat are fine, quite as small as those of the occiput; near the labials and submentals they rapidly increase in size.

"Body and limbs dark brownish; back darker, with numerous small spots of light blue. A dark-edged spot of the blue above the shoulder. In front of each shoulder there is a vertical band of bluish that does not reach the median line on the top of the neck. Along the vertebral line the back is lighter, and along this light band there are five pairs of dark spots, and at the hinder edge of each of these spots there is a smaller one of the light color. The first pair of the spots lies transversely in front of the vertical band, the second behind the shoulders, the third near the middle of the body, the fourth in front of the leg, and the fifth across the base of the tail.

"Chin and throat yellow to orange. Top and sides of head brown; with a yellow band from the angle of the mouth to the nape, another from the eye to the parietal region, and a third from the nostrils backward over the supraorbitals. On the crown the disposition of the yellow is irregular, but on each specimen there is a short median streak of the light color.

"This form is very closely allied to Gray's species *G. ocellatus* from Tobago. The principal differences seem to be in the coloration. The vertical streak is in front of the shoulder, and to reach the latter would have to turn back at its lower end. The head is not so high, and the outline from rostral to occiput is very slightly but quite regularly curved.

In the figure given, by Dr. Boulenger, of *G. ocellatus,* the scales under the fourth toe are smaller toward the base; in our species they are about equal in size."

Phyllodactylus tuberculosus Wiegmann. TUBERCULATED GECKO.

Phyllodactylus tuberculosus, COPE, Proc. U. S. Nat. Mus., XII, 1889, p. 145; GARMAN, Bull. Essex Inst., XXIV, 1892, p. 81; HELLER, Proc. Washington Acad. Sci., V, 1903, p. 60.

Diagnosis.—Limbs with enlarged tubercles; back with very distinct rows of enlarged tubercles; a median series of enlarged subcaudals.

Distribution.—In the Galapagos Archipelago, this gecko has been found only on Chatham Island.

Material.—Two specimens collected by the naturalists of the Albatross, in 1887-88, are Nos. 14949 and 14956 in the U. S. National Museum collection. Dr. Baur secured one specimen. The Academy has twenty-one specimens collected by Mr. Slevin.

Description of No. 10848.—Head elongate; snout depressed, rounded, and rather narrow, a little more than one and a half times as long as diameter of eye; ear-opening small with slight anterior denticulation of small scales, slightly nearer than nostril to eye. Body and limbs moderate, somewhat depressed, tail cylindro-conic. Snout covered with subequal, smooth, convex granules. Hinder part of head, temples, back of neck, and back and sides of body covered with smaller, smooth granules interspersed with enlarged tubercles. These large tubercles are smooth and rounded on the head, but trihedral and keeled on the neck and body. On each side of the middorsal line, there are three or four rows of these large tubercles on the neck and between the hind limbs, and from six to eight more or less irregular rows near the middle of the body. The tubercles are not close together in the rows. The small granules are flattened. Rostral much broader than high. Nostril between rostral, first labial, and three nasals, of which the upper is largest and meets its fellow of the opposite side. Nine or ten upper, and eight or nine lower labials. Mental large, a little longer than broad, bordered behind by two postmentals, which are followed by polygonal shields which gradually pass into the small gulars. Lower surface of body covered with smooth, imbricate scales, which change gradually into the granular laterals and small gulars; about forty longitudinal and seventy transverse series. Tail covered with small scales with irregular, interrupted whorls of large, keeled tubercles; an inferior median series of broad plates. Limbs with enlarged tubercles; digits slender, distal pads large, truncate; about fourteen lamellae under fourth toe.

The color everywhere above is light yellowish gray with irregular spots and bars of dark brown. The dark brown markings tend to form irregular longitudinal bands on the head, and cross-bars on the body and tail. A brown band runs from the nostril to the eye, and from the eye to the side of the body, passing just above the ear-opening. Other bands run back from the mouth and upper part of the eye. The transverse lines on the body tend to form reticulations. There are thirteen dark bars on the tail. The lower surfaces are yellowish white with minute slate dots.

Length to anus	61.
Snout to orbit	7.5
Snout to ear	15.
Orbit to ear	5.
Fore limb	21.
Hind limb	27.
Base of fifth to end of fourth toe	8.

Variation.—All the specimens agree in the distribution of the enlarged tubercles. These usually are in about seven rows on each side near the middle of the body; but the rows are somewhat irregular, and one sometimes counts six or eight. The postmentals in contact with the mental are two in all of our twenty-one specimens. All have the broad subcaudal series well-developed.

Young average darker than the adults, and have darker markings. The general pattern is similar in all, but, of course, is subject to more or less variation. Some specimens are more evidently cross-barred, while some are clearly reticulated.

The largest specimen measures 71 mm. from snout to anus.

Coloration in life.—"*P. tuberculosus* is more brightly colored than *P. leei,* having black blotches down the back. These blotches are seven or eight in number, and almost form bands. The large tubercles are very prominent, like little white spots; while the rest of the body is liver-colored, white underneath" (Slevin).

General remarks.—This gecko has been taken only on Chatham Island and has no very close relatives elsewhere in the Galapagos. It is widely distributed in continental America, and it seems probable that it has but recently been introduced into the Galapagos. Unfortunately I have no specimens from the mainland with which to compare those from Chatham. It is possible that minor differences may exist, although the series from this island agrees very well with descriptions of continental specimens.

Phyllodactylus gilberti Heller. WENMAN ISLAND GECKO.

Phyllodactylus gilberti, HELLER, Proc. Washington Acad. Sci., V, 1903, p. 61 (type locality **Wenman Island, Galapagos Archipelago**).

Diagnosis.—Limbs without enlarged tubercles; back with rows of enlarged tubercles, not very distinct except posteriorly;

lateral dorsal granules much larger than median ones; enlarged tubercles on neck but not on occiput; two postmentals; subcaudals considerably enlarged transversely.

Type.—Adult male. Leland Stanford Junior University Museum No. 4549. **Wenman Island, Galapagos Archipelago,** Hopkins-Stanford Expedition. December, 1898.

Distribution.—Wenman Island, Galapagos Archipelago.

Material.—The Hopkins-Stanford Expedition secured at least nine specimens. The California Academy has thirty-two of these geckos from Wenman Island, collected by Mr. Joseph R. Slevin, Sept. 24, 1906.

Description of the type.[1]—Dorsal tubercles small, two or three times the size of the dorsal granules, rounded, juxtaposed, and feebly keeled, in five longitudinal series on each side of sacral region; back and nape crossed by four rows, the three outer rows on each side disappearing before reaching middle of back. Rows of tubercles separated by two or three rows of granules; tubercles in the rows juxtaposed with few exceptions. Digital pallets wide, four times width of rest of digit, nearly two thirds the diameter of eye, trapezoid. Fourth toe with fourteen transverse lamellae inferiorly, the distal one divided. Head large, one half as long and two thirds as wide as the body. Ear-opening elliptical, oblique, two thirds the diameter of eye. Snout rounded at tip, the dorsal profile oblique, length slightly less than twice the diameter of eye. Interorbital region more or less concave; occipital region flat. Limbs moderate, the appressed fore limb reaching anterior border of eye; hind limb reaching appressed elbow. Head covered above with equal granules, smallest on occiput, becoming gradually larger anteriorly. Nostril situated between rostral, first superior labial, internasal and two posterior nasals. Internasals contiguous. Rostral twice as broad as high, slightly pentagonal with a median cleft above, bordered dorsally by two internasals. Mental subtriangular, longer than wide with obtuse angle posteriorly, followed by two hexagonal submentals. Superior labials six before middle of pupil, twice as long as high; five inferior labials anterior to middle of pupil, as high as long, first largest and more than two thirds size of mental. Belly and lower surfaces covered with smooth, rounded, imbricate scales; forty-five transverse series between axilla and groins. Tail of type imperfect. In younger specimens the tail is cylindrical, tapering gradually, covered above and on sides with imbricate, keeled scales about size of dorsal tubercles; covered inferiorly with a median series of enlarged scales.

Above (in life) pinkish gray with dusky blotches and spots; a median light pinkish stripe from nape to tail forking into several faint narrow cross-bars on back. Head lighter grayish with irregular dusky blotches above, snout faintly dusky-spotted, labials more heavily spotted, a dusky stripe beginning at tip of snout, passing through eye above ear-opening and becoming obsolete on shoulder, widest and most distinct just posterior to eye; sides lighter, dusky, spotted. In perfect specimens the tail is light like the head, the dark cross-bands narrower than the light areas and anteriorly broken up into spots. Limbs above barred and blotched with dusky. Underparts cream or whitish, the scales with minute dark dots.

[1] Heller.

The largest and smallest specimens measure

Length to anus	55.5	23.
Snout to orbit	7.	3.
Snout to ear	13.7	7.
Orbit to ear	5.	2.2
Fore limb	19.	9.
Hind limb	24.	9.8
Base of fifth to end of fourth toe	6.	3.

Coloration in life.—"The back is slate-blue with black markings, and a light stripe runs from the neck to the middle of the back. The lower surfaces of the body are pale lemon, and the throat is light flesh color" (Slevin).

Variation.—All the specimens before me have two postmentals in contact with the mental. The median band of small granules is constantly present, as is the series of enlarged subcaudals. There is much variation in the number and extent of the rows of enlarged, keeled, dorsal tubercles. These tubercles always are smaller than in any other Galapagoan geckos, and set close together in the rows. A row is almost always present from the neck to the base of the tail immediately outside the middorsal band of small granules. Other rows of enlarged tubercles are most in evidence on the sacral region and base of tail and between the forelimbs. There may be traces of only one or of two or three rows on each side of the back anteriorly; on the base of the tail there usually are three or four; while just in front of the hind legs there are four or five rows. The internasal plates are separated in several specimens. The lamellae under the fourth toe vary in number from twelve to sixteen.

The ground color is light yellowish gray in young, darker grayish brown or brown in adults. All specimens show at least a trace of the light gray middorsal band. This band may extend the whole length of the back or may be limited to the neck, where it is always most evident. Some specimens have no dark markings. The majority show, along the back of the neck and body, six or eight pairs of more or less definite dark brown blotches, which often are edged posteriorly by lateral branches of the light middorsal stripe. A brown band is usually present on the side of the face, but sometimes is nearly obsolete.

Habits.—"Sept. 24, 1906. Landed on the N. E. end of Wenman Island, and climbed up on a small plateau covered with cactus and small trees. We stayed only a few hours, and this appeared to be the best collecting ground. Hunted under the loose lava, and found geckos fairly common. They were most abundant along the edge of the cliffs, where the sea-birds nested. They were nearly all good-sized specimens that seem full-grown, and are the first ones on which I noticed claws. Lack of time prevented me from collecting more specimens. The elevation of this plateau is about two hundred feet" (Slevin).

General remarks.—This is a very distinct species. In it, as in the geckos of Chatham and Barrington islands, the enlarged dorsal tubercles are much reduced in number. It agrees with *P. tuberculosus* in the possession of enlarged subcaudals, but is, I believe, closely related to the other geckos native to the archipelago.

Phyllodactylus leei Cope. CHATHAM ISLAND GECKO.

Phyllodactylus leei COPE, Proc. U. S. Nat. Mus., XII, 1889, p. 145, (type locality **Chatham Island**); GARMAN, Bull. Essex Inst., XXIV, 1892, p. 83; HELLER, Proc. Washington Acad. Sci., V, 1903, p. 67.

Diagnosis.—Limbs and entire back without enlarged tubercles; digital expansions well developed; dorsal granules smooth, smaller than those on snout; mental about as long as broad, usually in contact with three (often two) postmentals; about ten to fourteen lamellae under fourth toe.

Type.—U. S. National Museum No. 14957. **Chatham Island, Galapagos Archipelago.** Prof. Leslie A. Lee of the Albatross. 1887-88.

Distribution.—Chatham Island, Galapagos Archipelago.

Material.—This species has been known from the type specimen, one collected by Dr. Baur, and three secured by the Hopkins-Stanford Expedition. The Academy collection includes one hundred and forty-eight specimens of various ages.

Description of No. 11994.—Head elongate; snout long, depressed, and rather narrow, a little more than one and a half times as long as the diameter of eye; ear-opening small with anterior denticulation of three or four scales, about as far as nostril from eye. Body and limbs moderate, somewhat depressed, tail cylindro-conic. Snout covered with subequal, smooth granules. Hinder part of head, temples, neck, and back and sides of body covered with smaller, smooth, convex granules. No enlarged tubercles anywhere. Rostral much broader than high. Nostril between rostral, first labial, and three nasals of which the upper is largest and meets its fellow of the opposite side. Eight or nine upper and seven or eight lower labials. Mental large, a little longer than broad, bordered behind by four postmentals which are followed by polygonal shields which gradually pass into the small granular gulars. Lower surface of body covered with smooth, imbricate scales which change gradually into the granular laterals and gulars; about twenty-five to forty longitudinal, and sixty to seventy transverse series. Tail covered with whorls of small smooth scales, no inferior median series of broad plates. Limbs without enlarged tubercles; digits slender, distal pads large, truncate; about twelve lamellae under fourth toe.

Yellowish or brownish gray above, palest on limbs and tail, irregularly dotted with dark brown on head, neck, body, limbs, and tail. A trace of a brown band may be made out from the nostril, through the eye and above the ear, to the side of the neck. The lower surfaces are yellowish white, faintly dotted and clouded with dark brown.

Length to anus	43.
Snout to orbit	4.5
Snout to ear	10.
Orbit to ear	3.3
Fore limb	12.6
Hind limb	17.5
Base of fifth to end of fourth toe	4.4

Variation.—All the specimens agree in the absence of scattered enlarged tubercles between the hind limbs or elsewhere. The number of the labials and the shape and size of the mental plate are not constant. The postmentals in contact with the mental are two in sixty-one specimens, three in eighty-four, and four in three (Nos. 10818, 10826, 11994). The ground color varies from a light brownish or yellowish gray to a dark brown. Specimens of either light or dark ground color, may show darker brown markings merely as scattered dots, as indefinite cloudings, spots, or blotches, or as definite cross-bars. The dark streak on the side of the face may be obsolete or very clearly shown. The smallest specimen measures seventeen millimeters from snout to anus.

Coloration in life.—*P. leei* are flesh-colored with indistinct black markings on the back; white underneath (Slevin).

Habits.—The following notes by Mr. Slevin are based upon both *P. leei* and *P. tuberculosus:*

"Oct. 16, 1905. Geckos are rare at Wreck Bay. I found ten during the day. They were under lava blocks. I saw very few broken egg shells. Oct. 17. Worked up the road to the settlement. Geckos were rare. I secured only seven or eight.

Found them under stones near the road. When taken they make a slight squeaking noise like a large beetle. Oct. 18. Got quite a number of geckos on an old road that branches off from the main one at about six hundred feet elevation. Jan. 25, 1906. Geckos have eggs in them now. Have not had the good fortune to run across the *Gonatodes* as yet. I find the other two kinds rare. Found no geckos shedding skins, as at the time of our former visit. Jan. 27. Found a few geckos at about 600 feet, all under the bark of trees. Feb. 23. Collected three geckos. July 5. Today I hunted principally for geckos, which I found scarce. July 7. Collected geckos and again found them rare. Most were taken under bark of dead trees, very few under rocks now. Went ashore in the evening with Williams to collect insects with a light, and secured several geckos on the edge of the beach. They probably were hunting for the little flies and insects which were abundant. They have the color of the sand, seem to be very much lighter than in the daytime, and are, as usual, very active."

General remarks.—Although this lizard has no enlarged tubercles, it evidently is closely related to the geckos of the other islands of the archipelago. The complete absence of enlarged dorsal tubercles makes *P. leei* appear very different from such forms as *P. bauri* and *P. galapagoensis,* but *P. barringtonensis* shows an intermediate stage. The snout is longer in *P. leei* than in *P. barringtonensis.*

The eggs are elliptical in outline, white, with very thin, limy shells. Their surface is covered with minute granules of lime in straight rows which, when magnified, make the shell appear covered with parallel scratches. One, taken in July, measures 9.4×6.5 mm. Others, found under lava blocks October 16-18, 1905, are 9.×6.8, 9×6.6, 9.2×6.1 and 9.×6.6. An embryo taken from one of the October eggs measures 15.2 from snout to anus.

Phyllodactylus barringtonensis new species. BARRINGTON ISLAND GECKO.

Diagnosis.—Limbs without enlarged tubercles; back with nearly uniform lepidosis except between insertions of hind limbs, where enlarged tubercles are present; digital expansions well developed; dorsal granules smooth, smaller than those on snout; mental a little longer than broad, usually in contact with three postmentals; ten or twelve lamellae under fourth toe.

Type.—Cal. Acad. Sci. No. 12057. **Barrington Island, Galapagos Archipelago.** J. R. Slevin. July 10, 1906.

Distribution.—Barrington Island, Galapagos Archipelago.

Material.—This species is known from nine specimens, the type and eight young, Nos. 10169-10172, 10212, and 10218-10220 of the Academy collection.

Description of the type.—Head elongate; snout long, depressed, and rather narrow, a little more than one and a half times as long as the diameter of eye; ear-opening small, with anterior denticulation of two or three scales, slightly nearer than nostril to eye. Body and limbs moderate, somewhat depressed, tail cylindro-conic. Snout covered with subequal, smooth, flattened granules. Hinder part of head, temples, neck, and back and sides of body covered with smaller, smooth, convex granules. No enlarged tubercles except between insertions of hind limbs, where remains of two or three rows may be made out on each side. Rostral much broader than high. Nostril between rostral, first labial, and three nasals of which the upper is largest and meets its fellow of the opposite side. Nine or ten upper and eight lower labials. Mental large, a little longer than broad, bordered behind by three postmentals, which are followed by polygonal shields which gradually pass into the small granular gulars. Lower surface of body covered with smooth, imbricate scales which change gradually into the granular laterals and gulars; about twenty to thirty longitudinal, and sixty to seventy transverse series. Tail covered with whorls of small, smooth scales, no inferior median series of broad plates. Limbs without enlarged tubercles; digits slender, distal pads large, truncate; about ten or twelve lamellae under fourth toe.

Yellowish or brownish gray above, palest on head, irregularly spotted and blotched with dark brown on head, neck, body, limbs, and tail. A brown band runs from the nostril through the eye, and above the ear, to the axilla. The lower surfaces are yellowish white faintly dotted with dark brown.

Length to anus	41.
Snout to orbit	4.6
Snout to ear	10.5
Orbit to ear	3.8
Fore limb	13.
Hind limb	17.5
Base of fifth to end of fourth toe	4.1

Variation.—All the specimens agree in the possession of the few scattered enlarged tubercles between the hind limbs. These are not prominent and in small specimens may easily be overlooked. No. 10171 has but two postmentals touching the mental; No. 10219 has four; the others all have three. The mental may be as wide as, or a little wider than, long.

Habits.—Mr. Slevin's field notes state: "Oct. 20, 1905. Four geckos were taken near the iguana colony. Three were under lava blocks, and one in an old cactus stump. Oct. 24. Went ashore for the morning, hunting geckos. Got three in the interior, beyond the iguana colony. Found them all under lava blocks."

General remarks.—The Barrington Island gecko is intermediate between *Phyllodactylus leei* of Chatham Island and *Phyllodactylus galapagoensis.* It agrees with the latter species in the number of its postmental plates, but approaches the former in the reduction of the enlarged dorsal tubercles.

Phyllodactylus galapagoensis Peters. GALAPAGOS GECKO.

Phyllodactylus galapagoensis, PETERS, Monatb. Berl. Ac. 1869, p. 720, (type locality **Galapagos Islands**);[1] STEINDACHNER, Festschr. Zool-bot. Ges. Wien, 1876, p. 329; GARMAN, Bull. Essex Inst., XXIV, 1892, p. 81; HELLER, Proc. Washington Acad. Sci., V, 1903, p. 63.

Diagnosis.—Limbs without enlarged tubercles; back with distinct rows of enlarged tubercles; no median series of broad subcaudals; large dorsal tubercles set close together in the rows, in six or rarely five rows on each side; snout shorter; two or usually more postmentals touching mental; occiput with enlarged tubercles; tubercles of some dorsal rows continued on neck anterior to insertion of fore limbs.

Type.—Collected by Dr. Kinberg on **Indefatigable, James,** or **Albemarle.**

Distribution.—Indefatigable, James, Cowley, Brattle, and Albemarle islands, Galapagos Archipelago. The subspecies *P. g. duncanensis* and *P. g. daphnensis* occur on Duncan and Daphne islands.

Material.—This gecko was first secured by Dr. Kinberg, who collected on Charles, Chatham, Indefatigable, James, and

[1] This specimen was secured by Dr. Kinberg, who collected reptiles on Charles, Chatham, James, Indefatigable, and Albemarle Islands. Dr. Peters description enables us to say that it did not come either from Charles or Chatham.

Albemarle islands. Dr. Baur collected ten specimens on Albemarle. Heller records twenty-two from Iguana and Tagus Coves, Albemarle, secured by the Hopkins-Stanford Expedition. The Academy collection includes seventy-nine specimens, as follows: four from Indefatigable, two from James, seven from Cowley Island, four from Brattle, five from Tagus Cove, Albemarle, two from Cowley Mt., Albemarle, ten from Iguana Cove, Albemarle, and forty-three from Vilamil and Cobos Settlement in southeastern Albemarle.

Description of No. 11262 from Iguana Cove, Albemarle. Head elongate; snout shorter and less depressed than in other species of Galapagoan geckos, a little more than one and a half times as long as the diameter of eye; ear-opening small, with very slight anterior denticulation of three or four scales, about as far as nostril from eye. Body and limbs moderate, somewhat depressed, tail cylindro-conic. Snout covered with subequal, smooth rounded granules. Hinder part of head, temples, neck, and back and sides of body covered with smaller, smooth granules. No enlarged tubercles on limbs. Occiput and anterior part of neck with scattered enlarged tubercles. Back, from root of tail to posterior part of neck, with very distinct regular rows of enlarged, keeled, trihedral tubercles. These large tubercles are in six rows on each side of midline at middle of body. The tubercles in each row are set close together, or are separated by not more than the diameter of one small dorsal granule. Rostral much broader than high. Nostril between rostral, first labial, and three nasals of which the upper is largest and is separated from its fellow of the opposite side by a small plate. Eight or nine upper and seven or eight lower labials. Mental large, a little longer than broad, bordered behind by three postmentals, which are followed by polygonal shields which gradually pass into the smaller gulars. Lower surface of body covered with smooth, imbricate scales which change gradually into the granular laterals and gulars; about thirty to forty longitudinal and seventy to seventy-five transverse series. Tail covered with whorls of small imbricate scales, feebly keeled on the dorsal surface of the base of the tail, elsewhere smooth; no inferior median series of broad plates. Limbs without enlarged tubercles; digits rather slender, distal pads large, truncate; about twelve lamellae under fourth toe.

The general color above is brownish gray, spotted and dotted on the limbs, head, neck and body with blackish brown. These dark markings tend to form seven or eight irregular cross-bars on the body. There is a faint dark streak from nostril to eye, and a very distinct one from the eye to the side of the neck. The tail bears seventeen dark brown cross-bars. The lower surfaces are light brown, minutely dotted with dark brown and with a few yellow spots and blotches on throat and tail.

Length to anus	45.
Snout to orbit	5.3
Snout to ear	11.2
Orbit to ear	4.
Fore limb	16.5
Hind limb	21.
Base of fifth to end of fourth toe	5.5

Variation.—The number of postmentals in contact with the mental plate varies considerably, but usually is more than two. The variation in this respect is shown in the following table:

POSTMENTALS IN CONTACT WITH MENTAL PLATE.

Locality	2	3	4	5	6
Daphne		7	1		
Indefatigable	1	3			
James		1	1		
Cowley Island		1	5		1
Duncan		2			
Brattle		4			
Tagus Cove	1	3		1	
Cowley Mt.		1	1		
Iguana Cove	2	7	1		
Vilamil	10	27	3	1	
Cobos Settlement	1		1		
Total	15	56	13	2	1

The enlarged tubercles vary considerably. The lower row on the body may be well developed, or may be represented by only a few tubercles. Counting these, there nearly always are six rows on each side of the back. Exceptions are found in specimens from Daphne, Cowley Island, Cowley Mt., and Tagus Cove. The upper dorsal rows of tubercles are continued, more or less irregularly, forward to the back of the neck anterior to the insertions of the fore limbs in all the specimens except one from Tagus Cove and eight from Daphne. The tubercles in the dorsal rows are set much closer together than in *P. bauri,* being usually either in contact or separated by not more than the diameter of one small granule. However, the two specimens from Duncan Island have many tubercles of the upper rows separated by greater spaces often occupied by several small granules. A somewhat similar spacing is found in one of the Indefatigable specimens (No. 10393), but none of the other examples of *P. galapagoensis* show any approach to this condition.

The Daphne specimens have few or no enlarged tubercles on the head, and a similar lack of them is found in the geckos from Tagus Cove, Cowley Mt., Cowley Island, and Brattle. In specimens from Indefatigable, James, and Duncan there are many enlarged tubercles on the head. Examples from southern Albemarle (Iguana Cove, Vilamil and Cobos Settlement) show more variation in this respect, and may have on the head many, a moderate number, or few enlarged tubercles.

The following table is intended to show the variation in the number and distribution of the enlarged tubercles:

NUMBER AND DISTRIBUTION OF ENLARGED TUBERCLES.

Locality	Dorsal Rows				On Head		
	5	6	On Neck	Not on Neck	Few	Moderate	Many
Daphne	8	0	0	8	8	0	0
Indefatigable	0	4	4	0	0	0	4
James	0	2	2	0	0	0	2
Cowley Island	2	5	7	0	6	1	0
Duncan	0	2	2	0	0	0	2
Brattle	0	4	4	0	4	0	0
Tagus Cove	2	3	4	1	5	0	0
Cowley Mt.	1	1	2	0	2	0	0
Iguana Cove	0	10	10	0	3	4	3
Vilamil	0	41	41	0	5	22	14
Cobos	0	2	2	0	1	1	0

While there is much variation in color, I have not been able to reach any conclusions of value concerning it.

The data derived from the study of the postmentals and enlarged tubercles may be arranged in the following tentative key:

a.—Tubercles of some dorsal rows continued on neck anterior to insertion of fore limbs; snout shorter; dorsal tubercles in six (or rarely five) rows on each side.
  b.—Tubercles in upper dorsal rows set less closely, usually separated by two or more granules.
    Duncan.
  b².—Tubercles in upper dorsal rows set closely, as in other rows, rarely separated by more than one granule.
    c.—Many enlarged tubercles on top of head.
      Indefatigable, James.
      Some from Iguana Cove and Vilamil.
    c².—Few enlarged tubercles on head.
      d.—Usually not more than three postmentals touching mental.
        Some from Iguana Cove and Vilamil.
        Brattle, Cowley Mt., Tagus Cove.
      d².—Usually more than three postmentals touching mental.
        Cowley Island.
a².—Tubercles of dorsal rows absent on neck anterior to insertion of fore limbs; snout longer; dorsal tubercles in five rows on each side.
    Daphne.

The Duncan and the Daphne geckos seem to be well worthy of recognition as subspecies, and will be named and characterized as such on a subsequent page. Those from some of the other localities may perhaps require similar treatment when larger series have been gathered, but it now seems best to use but one name for the Indefatigable, James, Cowley, Brattle, and Albemarle specimens.

Habits.—Mr. Slevin's field notes on this species are as follows:

"James Island. Dec. 29, 1905.—I saw three geckos, and got two from under the bark of a large thorn tree. These were the only ones seen by any of the party.

"Cowley Island. August 13, 1906.—I collected several geckos under the loose lava blocks.

"Brattle Island. Oct. 20, 1905.—Collected two snakes and four geckos.

"Tagus Cove, Albemarle. March 23 to 31, 1906.—Geckos are rare, according to Williams. He has collected three, so far, while hunting for beetles under stones. April 4, 1906.—I have found no geckos here, nor have I seen any snakes.

"Cowley Mt., Albemarle. Aug. 10 and 11, 1906.—Williams collected two geckos under an old piece of tortoise shell at about 400 feet elevation. He also reports seeing one at about 1800 feet.

"Iguana Cove, Albemarle. March 19, 1906.—No one of the party saw any geckos. March 20.—Williams got a gecko today under a rock near the cove. March 21.—Eggs of geckos are common under the stones, and Williams collected a few. He also secured some geckos, but they are not very abundant so far as observed. They were all taken under stones.

"Vilamil, Albemarle. Nov. 3, 1905.—Williams brought in quite a number of geckos. They were found under the bark of trees on the trail to the settlement. March 5, 1906.—Two geckos were found under the bark of old dead stumps. March 7, 1906.—Geckos are rare here, and seem to live under the bark of trees and in old wood rather than under stones. August 22 to 30, 1906.—Williams found a few geckos under the bark of trees at an altitude of about 1500 feet."

General remarks.—No geckos have been taken on Narborough Island. However, there is no reason for thinking that they do not occur there, and I believe that a *Phyllodactylus* either identical with, or closely related to *P. galapagoensis* will some day be found there. While none of these lizards were secured at Banks Bay, Albemarle Island, two eggs collected there attest their presence. These eggs were taken, April 14, 1906, from holes in mangrove trees growing on the beach. They were about ten feet above the ground, and measure 10.3×8.5 and 10.5×8.6 mm. Other eggs, secured under stones at Iguana Cove, March 21, 1906, measure 9.9×8.4, 10×8, 10.4×7.7, and 10.7×8.2 mm. It will be seen that these eggs are larger than those of *P. leei.* They are elliptical, with thin, white, limy shells, which appear as though covered with a multitude of minute, crossed, more or less parallel scratches or rows of minute granules.

Phyllodactylus galapagoensis daphnensis, new subspecies.
Daphne Island Gecko.

Diagnosis.—Limbs without enlarged tubercles; back with distinct rows of enlarged tubercles, five rows on each side; no median series of broad subcaudals; large dorsal tubercles set close together in the rows, or separated by not more than diameter of one granule; tubercles of dorsal rows not continued on neck anterior to insertion of forelimbs; snout longer; few enlarged tubercles on top of head.

Type.—California Academy of Sciences No. 10539. **Daphne Island, Galapagos Archipelago.** J. R. Slevin. Nov. 23, 1905.

Material.—Eight specimens are in the collection of the Academy.

Description and Variation.—The description of *P. galapagoensis* applies in general, and a statement of variation is included under that head.

General remarks.—It was a surprise to find that the gecko of Daphne differed so markedly from that of Indefatigable and James. I had been inclined to regard Daphne as an outlying rock recently separated from Indefatigable, as the Seymours doubtless have been. The differentiation of this gecko, however, indicates a separate insular existence through a considerable period of time.

Mr. Slevin states: "Nov. 23, 1905.—I caught several geckos under old dead cactus on the inner slope of the crater, near the top."

Phyllodactylus galapagoensis duncanensis, new subspecies.
DUNCAN ISLAND GECKO.

Diagnosis.—Limbs without enlarged tubercles; back with distinct rows of enlarged tubercles, six on each side; no median series of broad subcaudals; large dorsal tubercles set close together except in the upper dorsal rows, where they are usually separated by two or more granules; tubercles of some dorsal rows continued on neck anterior to insertion of fore-limbs; snout shorter than in *P. g. daphnensis;* many enlarged tubercles on top of head.

Type.—California Academy of Sciences No. 10600. **Duncan Island, Galapagos Archipelago.** J. R. Slevin. Dec. 9, 1905.

Material.—Only two specimens are in the Academy's collection.

Description and Variation.—See *P. galapagoensis.*

Habits.—Nothing is known of the habits of the geckos of Duncan Island. Mr. Slevin's field notes contain only the following item: "Dec. 11 to 16, 1905, I got three geckos near the camp, but they were rare and I did not have much time to look for them."

Phyllodactylus bauri Garman. BAUR'S GECKO.

Phyllodactylus galapagoensis, GUNTHER, Proc. Zool. Soc., 1877, p. 67; BOULENGER, Cat. Lizards Brit. Mus., I, 1885, p. 82; COPE, Proc. U. S. Nat. Mus., XII, 1899, p. 145.

Phyllodactylus bauri, GARMAN, Bull. Essex Inst., XXIV, 1892, p. 81 (type locality **Las Cuevas, Charles Island, Galapagos**); HELLER, Proc. Washington Acad. Sci., V, 1903, p. 63.

Diagnosis.—Limbs without enlarged tubercles; back with distinct rows of enlarged tubercles; no median series of broad subcaudals; large dorsal tubercles not set close together in the rows, in five or six rows on each side of back; snout longer than in *P. galapagoensis;* two, or very rarely three, postmentals touching mental; occiput with few or no enlarged tubercles; tubercles of dorsal rows rarely continued on neck anterior to insertion of fore limbs.

Type.—Collected by Dr. George Baur, at **Las Cuevas, Charles Island, Galapagos Archipelago,** in 1891. I have been unable to learn the present location of this specimen.

Distribution.— Charles, Gardner-near-Charles, Champion, Enderby, Hood, and Gardner-near-Hood islands, Galapagos Archipelago.

Material.—Two specimens collected by Commander Cookson of the "Peterel" are in the British Museum. A single specimen collected by the naturalists of the "Albatross," and now in the U. S. National Museum, probably belongs to this species. The type was secured by Dr. Baur in 1891. The Hopkins-Stanford Expedition secured this gecko on Charles, Hood, and Gardner Islands. This material, recorded by Heller, is in the collection of Leland Stanford Junior University. The Academy's expedition secured over five hundred of these geckos on Charles, forty-seven on Hood, forty-two on Gardner-near-Hood, three on Gardner-near-Charles, and one each on Champion and Enderby islands.

Description of No. 9766 from Charles Island. Head elongate; snout longer and more depressed than in *Phyllodactylus galapagoensis,* a little more than one and three-fourths times as long as diameter of the eye; ear-opening small, with anterior denticulation of three or four scales, about as far as nostril from eye. Body and limbs moderate, somewhat depressed, tail cylindro-conic. Snout covered with subequal, smooth, rounded granules. Hinder part of head, temples, neck, and back and sides of body covered with smaller, smooth granules. No enlarged tubercles on limbs. Occiput and anterior part of neck with no enlarged tubercles. Back, from root of tail to posterior part of neck, with very distinct regular rows of enlarged, keeled, trihedral or rounded tubercles. These large tubercles are in five rows on each side of midline at middle of body. The tubercles in each row are set somewhat irregularly, but usually are separated by from two to four small dorsal granules, although sometimes only one granule intervenes. Rostral much broader than high. Nostril between rostral, first labial, and three nasals of which the upper is largest and is in contact with its fellow of the opposite side. Eight or nine upper, and seven or eight lower labials. Mental large, a little broader than long, bordered behind by two postmentals, which are followed by polygonal shields which gradually pass into the smaller gulars. Lower surface of body covered with smooth, imbricate scales, which change gradually into the granular laterals and gulars; about thirty to thirty-five longitudinal, and seventy to seventy-five transverse series. Tail covered with whorls of small imbricate scales, feebly keeled on the dorsal surface of the base of the tail, elsewhere smooth, no inferior median series of broad plates. Limbs without enlarged tubercles; digits rather slender, distal pads large, truncate; about eleven lamellae under fourth toe.

The general color above is brownish gray, spotted, dotted, and blotched with dark brown on the limbs, head, neck, body, and tail. These dark markings form seven cross-blotches on each side of the midline, where they are interrupted. A dark streak runs from the nostril to the eye, and from the eye to the side of the neck, passing just above the ear-opening. The labials are spotted with dark brown. The lower surfaces are yellowish white, with a brownish suffusion formed by minute dark dots.

Length to anus	48.
Snout to orbit	5.5
Snout to ear	12.4
Orbit to ear	4.2
Fore limb	16.3
Hind limb	21.5
Base of fifth to end of fourth toe	5.4

Variation.—The number of postmentals in contact with the mental is very constant. It is two in every specimen except numbers 9800 and 11720 from Charles and 9412 from Hood Islands. In these three specimens three postmentals touch the mental, while in the other six hundred and sixty-eight examples the number is constantly two.

There is considerable variation in the enlarged dorsal tubercles. In fifty specimens from Charles, I count five rows in thirty-one and six in nineteen. In forty-seven from Hood, the counts are five rows in thirty, six in sixteen, and seven in one. Of ten from Gardner-near-Hood, six have five rows and four have six. In these one hundred and seven specimens, the only ones examined in these respects, the dorsal tubercles are continued on the neck anterior to the fore limbs very slightly in one from Charles, and nearly to the middle of the neck in five from Hood, but not at all in any of the others. In a few specimens from Charles and Hood the tubercles fail to reach as far forward as the fore limbs, and in a few of the Charles examples they are as little developed as in the one from Champion and two from Gardner-near-Charles, in which only the upper row is continued forward much beyond midway between the limbs. Occasionally tubercles are found in contact, or separated by only one small granule; but in all specimens the greater number of tubercles always are separated by from two to four granules.

I have been unable to find any sufficient basis for the separation of the geckos of Charles and of Hood islands. Perhaps, on the whole, the enlarged dorsal tubercles are less strongly keeled in Charles specimens than in those from Hood, but one finds many Charles specimens with tubercles keeled as strongly as in Hood Island examples. If there is an average difference in this respect it is too intangible to use as a means of classification. The only real difference which I have been able to detect is in the presence of enlarged granules or tubercles on the top of the head. In fifty-eight specimens from Hood and

Gardner-near-Hood the granules on the posterior part of the upper surface of the head are quite uniform in all but four. In these four exceptions a very few granules are somewhat enlarged. In fifty geckos from Charles Island, on the other hand, only ten have no enlarged granules in this region, while thirty-one have a few, and nine a moderate number of enlarged granules. Here, again, the difference is not great enough to justify the separation of the geckos of these two islands.

There is so much variation in color that nothing of value can be said concerning it. Specimens may be either dark or light, heavily blotched or nearly unicolor.

Habits.—Mr. Slevin's field notes are as follows:

"Charles. Oct. 4, 1905.—Collected the geckos on a small mountain about two miles inland. Found them all under lava blocks. Oct. 6.—Caught several geckos under lava blocks. We found them quite plentiful, but the elevated land is the best place to get them. They have eggs in them at this date, and a great many broken shells can be found under the lava blocks. Oct. 7.—Went ashore at Black Beach. Saw no reptiles except geckos. These were common, especially near the beach, but grew scarce at 1000 feet elevation. They were found under loose lava blocks and dried wood. Also got several eggs, in some of which I found geckos. Oct. 9.—I found no geckos over 1000 feet elevation. They were all taken on the slope facing Black Beach. When captured they make a slight squeaking sound, somewhat like a mouse. Oct. 11.—Collected one hundred and twenty-five geckos along the slope under old wood and lava blocks. March 2, 1906.—I found the geckos very common under stones or rather large pieces of lava. They seem at this time to be lower down in the dry belt. I found them rare at 200 feet. Higher up the ground now is moist under the rocks; so, as they seem to prefer a dry country, they apparently have moved down toward the beach. I found some of the females with eggs well enlarged. May 23, 1906.—Found geckos abundant under the loose lava blocks near Black Beach. Collected sixty-nine during the afternoon.

"Champion, near Charles. Oct. 3, 1905.—Covered the island in an hour and a half. I saw two geckos under lava blocks and caught one.

"Hood. Sept. 26, 1905.—They were found in the holes in the wood made by insects; generally in the smaller branches of the brush. They are very quick and can easily escape in the brush or under the rocks which cover the ground everywhere. Two eggs were found under a stone. Oct. 1.—The geckos were found in old wood and cactus stumps. None were found under rocks. Feb. 1, 1906.—Williams collected several geckos under lava blocks near the shore.

"Gardner-near-Hood. Sept. 27, 1905.— Found several geckos—some under stones and some in old wood. Feb. 3, 1906.—Found the geckos fairly common under loose lava near the beach."

General remarks.—Enderby, Champion, and Gardner are three islets near Charles, while a second Gardner bears the same relation to Hood Island. The fact that different, though closely related, species of snakes occur on Charles and Hood islands has led me to expect to find similar differentiation in the geckos. That such differences do not exist, is not less interesting, for it emphasizes the close relationship between the reptilian fauna of these two islands—a relationship which I believe indicates a former connection between Charles and Hood, after their separation from the rest of the archipelago.

Eggs found under loose stones on Charles islands, October 4 to 11, 1905, measure 9.5×7, 10×7.1, 10×7.8, 10×8, 10.4×7.2, 10.4×8.6, 10.5×7.4, 10.7×7.9, 10.9×7.6, 10.9×8, 11×7.3, 11×8, and 11.3×7.8. One from Hood measures 10×7.4 mm. The shells are of the same character as those of *P. leei* from Chatham and *P. galapagoensis* from Albemarle.

PROCEEDINGS

Fourth Series

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VOLUME II

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BY

ALBAN STEWART

Botanist to the Galapagos Expedition
and Instructor in Botany in the University of Wisconsin

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NOTES ON THE LICHENS OF THE GALAPAGOS ISLANDS

BY ALBAN STEWART

Botanist to the Expedition and Instructor in Botany in the University of Wisconsin

While acting as botanist to the recent expedition sent by the California Academy of Sciences to the Galapagos Islands, I made a considerable collection of lichens. I am not a lichenologist in any sense of the word, and it is with some hesitation that I approach a subject with which I have so little acquaintance. However, as I made a number of notes on the subject while collecting there, and as very little has been written on the general distribution etc. of the *Lichenes* of these islands, it seems worth while to publish those notes, along with a list of the species which were secured. This list is probably far from complete, for I was more interested in collecting and studying the distribution of the vascular plants; and it was often the case that lichens were carefully collected only where no vascular plants in good condition were to be found, as was sometimes the case when the lower islands were visited during the dry season. Notwithstanding the rather neglectful way in which this group of plants was treated, sixteen species were found which had not before been reported from the islands, and the range of quite a number of species already known was considerably extended. There were, however, some fifteen species reported by former expeditions to the islands, which do not appear in my collection. Some of these have been taken but once.

I wish here to express my thanks to Dr. W. G. Farlow of Harvard University for his kindness in making the identification of the lichens in this collection—a task which, with my limited knowlege of the subject, would have been impossible for me. In the list of species which follows, bibliographic references are omitted—it would have been too great a favor to ask of Dr. Farlow to look them up, and I did not feel competent to undertake it.

In order to bring our knowledge of the lichenaceous flora of these islands down to date, all species which have been reported from them, but which escaped me in my collecting, are included in the list.

When one lands for the first time on almost any of the islands, one is immediately struck with the great abundance of lichens. This is true not only in the case of the larger and higher islands, which reach sufficient elevation to receive a considerable amount of moisture from the fog-banks which strike their sides, and which consequently support a more or less luxuriant vegetation; but it is also true in the case of the smaller and lower islands, where the amount of moisture received throughout the greater part of the year is very scanty, and where, in consequence, desert or semi-desert conditions prevail. On islands of both sorts, lichens often lend a striking appearance to the vegetation, the fruitcose forms being the most important in this respect. *Alectoria sarmentosa* is one of the most common of these. It is found largely in the transition region*, where the branches both of trees and of bushes are often heavily covered with masses of this rather filmy species. On the south side of Indefatigable Island, it

* For a discussion of the botanical regions of these islands, see Stewart: Proc. Cal. Acad. Sci., 4th Ser., v. I, pp. 208-211.

gives a distinct color to the vegetation of the transition region; and on Duncan Island above 500 ft. elevation, it occurs to such an extent as to give the trees and shrubs on the upper part of the island, when seen from a distance, the appearance of being covered with a light green foliage, even during the dry season, when they are out of leaf. Similar but less marked conditions are found at Villamil, Albemarle Island, and on Jervis Island.

Next to *Alectoria* the *Usneas* are probably the most striking of the fruticose forms, and the two species in the collection, *U. ceratina* and *U. longissima,* were usually found in situations similar to those of *Alectoria.* In the transition region they cover the branches of trees with long festoons, and occasionally they are found in the moist regions. The greatest display of *Usneas* is at Cowley Bay on the east side of Albemarle Island, where they occur abundantly above 1800 ft. elevation, mostly on branches of *Bursera graveolens.* This tree, in all the regions where it occurs, seems to form a favorite host (if I may use that term in this connection) for a considerable number of lichens, not only of fruticose, but of foliose and crustaceous forms as well.

Of the three species of *Ramalina* in the collection, *R. complanata* is usually found on the dryer parts of the islands, forming small tufts on dead sticks and twigs. *R. farinacea* occurs where conditions are not so dry as in the last instance, and sometimes even in the moist regions; while *R. usneoides* occurs in both dry and moist situations. It was found on both Barrington and Charles islands under very dry conditions, and on Albemarle and Indefatigable islands, where conditions were moist.

Both of the species of *Rocella* collected were found in the dry and lower transition regions. *R. peruensis* occurs commonly on bushes and small trees, forming tufts pendant from the branches. There seems to be a great difference in the width of the thallus in different specimens, especially toward the ends of its branches. In some the branches are very slender, while in others they are a millimeter in width near the tips. The second species, *R. portentosa,* occurs almost exclusively on rocks. It often forms large masses, especially in protected places on the under side of projecting blocks of lava, where it has a tendency to grow larger than in more open situations. It is the largest fruticose lichen found on the islands.

The *Cladonias* are found, for the most part, under decidedly moister conditions than are the other species of fruticose lichens. *C. adspersa* and *C. fimbriata* were found growing near the top of the main mountain on Chatham Island, along with ferns and other mesophytic plants. At the time the specimens were collected, this portion of the island was heavily enveloped in fog, and on subsequent visits to this locality the same condition prevailed. *C. ceratophylla* was found under somewhat similar conditions near the summit of James Island. The fourth species in the collection, *C. pycnoclada,* is found under both xerophytic and mesophytic conditions. It occurs in large tufts on the lava on the west side of the mountain at Tagus Cove, Albemarle Island; and although it is found at a high altitude here, the surrounding vegetation was decidedly xerophytic in character—a condition which on this side of the mountain continues to the top, because this is the leeward side, and is not bathed by the fog-laden wind. It was also found on Chatham Island along with lycopods and ferns, and was taken by Snodgrass and Heller from the mountain at Iguana Cove on Albemarle Island, at an elevation of 925 m. Although this elevation was not reached at Iguana Cove by any of the members of our party, the conditions there must be very moist, if one may judge from the conditions found nearer the base of the mountain.

Parmelia latissima is the most common of the foliose species, occurring throughout the transition and the moist regions, and often heavily covering branches of trees and bushes, sticks, and dead logs. It was specially abundant about the summit of Duncan Island, where the vegetation is quite open; but in the moister portions of the islands where the vegetation is dense, it is found sparingly. Two other foliose species which occur both in the upper transition and in the moist regions, are *Sticta aurata* and *S. quercizans,* both of which are found usually on the bark of trees; and while in places they are fairly common, they never so completely cover the trees as does the *Parmelia* just mentioned. Another species characteristic of both the upper transition and the moist regions is *Chiodecton sanguineum,* whose conspicuous red thallus is often found adhering to branches, dead sticks, grass culms, etc. Two species which occur mostly in the dry regions are *Physcia picta* and *Lecanora punicea,* both of which are found largely on the branches of *Bursera graveolens,* although the first is also one of the common forms inhabiting lava-boulders in the dry regions. Foliose lichens are neither as abundant as a whole, nor do they lend as striking an aspect to the vegetation in the places where they occur, as do the fruticose forms.

Of the rock-inhabiting forms, *Placodium murorum* and *Physcia picta* seem to be the most common. They often cover the lava-boulders on the lower parts of the islands to such an extent as to give them, when seen from a short distance, the appearance of being covered with paint. Rock-encrusting forms are seldom found on lava of recent origin, but rather where oxidation has set in, and at least the surface of the lava has begun to disintegrate. They are seldom found in the moist regions, even where there are exposures of lava which apparently would furnish them with a suitable habitat. Two forms which encrust the branches of trees are *Verrucaria ocraceo-flava* and *Pyrenula aurantica,* both of which are found in the dry regions.

From the above it is seen that lichens are common throughout the dry and the transition regions, but decrease in numbers in the moist regions. The transition is distinctly the region for lichens, probably because there is more moisture in this region than lower down; but why they are not more abundant in the moist regions where there is a still greater amount of moisture, I am unable to say. In the moist regions, in so far as the epiphytic forms are concerned, their place seems to be taken by the leafy hepatics, which often cover the trees and bushes in great profusion. Foliose and fruticose forms present the greatest display where there is at least a fair amount of moisture, while the encrusting forms seem to have a distinct preference for the dryer parts of the islands.

Alectoria Ach.

A. sarmentosa Ach.—Abingdon Isl.: very abundant on the branches of small trees and bushes at 500-900 ft. (No. 415). Albemarle Isl.: Cowley Bay, common on the branches of *Bursera graveolens* above 1000 ft. (No. 416); Villamil, common at 200-400 ft. Chatham Isl.: Wreck Bay, common on the branches of trees and bushes in the neighborhood of 700 ft. (No. 417). Duncan Isl.: very abundant above 500 ft. Indefatigable Isl.: Academy Bay, very abundant on the branches of trees at 100-350 ft.; northwest side, common on trees at 950 ft. (No. 420); southeast side, covering trees and bushes at 350-550 ft. Jervis Isl.: very abundant on small bushes, 450-750 ft. (no. 421).

Arthonia Ach.

A. gregaria (Weig.) Koerb.—Duncan Isl.: *Snodgrass and Heller.* Not obtained by the Academy's expedition.

A. nivea Willey—Galapagos Ids.: *Hassler Expedition.* Not obtained by any of the more recent expeditions that have visited the islands.

A. platyspeilea Nyl.—Gardner Isl. (near Hood): *Snodgrass and Heller.* Not obtained by the Academy's expedition.

A. sp. Willey—Galapagos Ids.: *Hassler Expedition.*

Buellia De Not.

B. straminea Tuck. in herb.—Albemarle Isl.: Christopher Point, *Snodgrass and Heller.* Not obtained by the Academy's expedition.

B. sp. Farlow—Bindloe Isl.: *Snodgrass and Heller.*

Chiodecton Ach.

C. sanguineum (Sw.) Wainio—Abingdon Isl.: *Snodgrass and Heller.* Duncan Isl.: sterile specimens were obtained from the culms of grasses on the moister parts of the island at about 1300 ft. (No. 422). Indefatigable Isl.: southeast side, common on the trunks of trees above 650 ft. (No. 423). James Isl.: James Bay, common on the trunks and branches of trees in the neighborhood of 2000 ft., but was not noticed some eight hundred feet higher up near the summit of the island, (Nos. 424-425).

Cladonia (Hill) Wainio emend.

C. adspersa Floerke—CHATHAM ISL.: Wreck Bay, abundant covering rocks and moist earth on the southeast side of the main mountain at 1900-2000 ft. (No. 426).

C. ceratophylla Eschw.—JAMES ISL.: James Bay, common on dead logs and other decaying vegetation above 2150 ft. (No. 427).

C. fimbriata Hoffm.—ALBEMARLE ISL.: Villamil, common on rocks and dead wood at 500 ft. (No. 428). CHATHAM ISL.: Wreck Bay, common on moist soil at 2000 ft. with *C. adspersa*, (No. 429).

C. pycnoclada (Gaud.) Nyl.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller;* Tagus Cove, in large masses 1 ft. or more in diameter, on lava beds above 2500 ft. (No. 430). CHATHAM ISL.: Wreck Bay, forming occasional masses of a considerable size on bushes at about 1700 ft. (No. 431).

C. sp.—DUNCAN ISL.: on rocks at 900 ft. (No. 432).

C. sp.—JAMES ISL.: James Bay, on the trunks of trees and on the fronds of dead ferns at 2800 ft.

Coenogonium Ehrenb.

C. sp.—JAMES ISL.: James Bay, common on the trunks of trees at 2000 ft. (No. 433).

Lecanora Ach.

L. glaucovirens Tuck.—GALAPAGOS IDS.: *Hassler Expedition.* Not obtained by any of the later expeditions to these islands.

L. pallescens Ach.—BARRINGTON ISL.: occasional, encrusting the dead branches of trees, (No. 434). CHARLES ISL.: on the branches of trees at 800 ft. (No. 435).

L. punicea Ach.—TOWER ISL.: common on the trunks and branches of *Bursera graveolens,* (No. 436).

Lecidea Ach.

L. flavo-areolata Nyl.—GALAPAGOS IDS.: *Hassler Expedition.* Not obtained by any of the subsequent expeditions to these islands.

Pannaria Del.

P. molybdaea (Pers.) Tuck.—INDEFATIGABLE ISL.: southeast side, rare on trees at 625 ft. (No. 437).

Parmelia Ach.

P. camtschadalis Eschw.—JAMES ISL.: James Bay, rare on dead trunks of trees at about 2150 ft. (No. 438).

P. latissima Fée—ALBEMARLE ISL.: Iguana Cove, abundant on rocks on the side of the cliff above the cove, (No. 439). CHARLES ISL.: common on rocks and tree trunks at 1000 ft. (Nos. 440-441). DUNCAN ISL.: on rocks and dead twigs at 1200 ft. (Nos. 442-443). JAMES ISL.: James Bay, common on the trunks of trees at about 2000 ft. (No. 444).

P. perlata Krumph.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller.* CHARLES ISL.: *Andersson.*

P. sp. (*P. physodi* Fries., *P. affinis* Andersson)—CHARLES ISL.: *Andersson.* Not collected by any of the later expeditions.

Pertusaria DC.

P. albinea Tuck.—GALAPAGOS IDS.: *Hassler Expedition.* Has not been obtained from these islands since.

P. leioplaca (Ach.) Schaer. forma **bispora**—TOWER ISL.: on the trunks and branches of *Bursera graveolens* (No. 353).

Physcia (DC.) Th. Fr.

P. leucomela (L.) Michx.—JAMES ISL.: *Darwin.* Not obtained by any subsequent expedition.

P. picta (Sw.) Nyl.—BARRINGTON ISL.: common on the branches of bushes and trees, (No. 359). CHARLES ISL.: common on the branches of trees at about 1100 ft. (No. 358). DUNCAN ISL.: common on rocks at 900 ft. (No. 357). SEYMOUR ISL.: south side, very abundant, encrusting rocks, (No. 360).

Placodium DC.

P. murorum DC.—SEYMOUR ISL.: south side, encrusting rocks along with *Physcia picta,* (No. 360).

Pyrenula Fée.

P. aurantiaca Fée—Narborough Isl.: southern part, *Snodgrass and Heller.* Tower Isl.: common on the trunks of *Bursera graveolens,* (No. 362).

Ramalina Ach.

R. complanata Ach.—Albemarle Isl.: Turtle Cove, common on dead branches, (Nos. 363-364). Brattle Isl.: common on bushes, (No. 370). Charles Isl.: common on twigs at 1000 ft. (No. 366). Chatham Isl.: Wreck Bay, common on twigs and bushes, (No. 365). Gardner Isl.: (near Hood), *Snodgrass and Heller.* Hood Isl.: abundant on dead bushes, (Nos. 367-368). Tower Isl.: common on bushes, (No. 369).

R. farinacea Ach.—Albemarle Isl.: Villamil, common on dead twigs at 1350 ft. (No. 372). Duncan Isl.: common on bushes at 1200 ft. (No. 373). Indefatigable Isl.: southeast side, common on bushes, (No. 371). Jervis Isl.: abundant on dead twigs above 450 ft. (No. 374).

R. indica Fr.—Charles Isl.: *Andersson.* Not since obtained from the islands.

R. usneoides Fr.—Albemarle Isl.: Villamil, common on the trunks of trees up to 600 ft. (Nos. 375-376). Barrington Isl.: common on dead bushes, (No. 378). Bindloe Isl.: *Snodgrass and Heller.* Charles Isl.: common on trees up to 600 ft. (No. 377). Indefatigable Isl.: Academy Bay, occasional on the trunks of trees at about 450 ft. (No. 379).

R. sp.—Charles Isl.: covering bushes, indeterminate as to species. Indefatigable Isl.: southeast side, on twigs at 600 ft. probably of the same species as the sterile specimens from Charles Isl.

Rinodina Mass.

R. mamillana Tuck.—Galapagos Ids.: *Hessler Expedition.* Not obtained by any subsequent expedition.

Roccella DC.

R. peruensis *Kremplh.*—Albemarle Isl.: Villamil, abundant on trees and bushes on the lower and dryer parts of the island, (No. 382). BARRINGTON ISL.: common on trees of *Bursera graveolens,* (No. 392). BRATTLE ISL.: on bushes, (No. 383). CHARLES ISL.: common on the branches of trees on the lower parts of the island, (No. 386). CHATHAM ISL.: Wreck Bay, *Snodgrass and Heller.* HOOD ISL.: common on dead bushes, (Nos. 387-388). INDEFATIGABLE ISL.: northeast side abundant on bushes, (No. 389); southeast side, on dead bushes, (No. 390). JERVIS ISL.: common on trees of *Bursera graveolens,* (No. 391). SEYMOUR ISL.: south, common on bushes, (No. 385). TOWER ISL.: common on trees of *Bursera graveolens,* (No. 384). A species rather characteristic of the dry regions on the islands where it occurs.

R. portentosa Mont.—BARRINGTON ISL.: common on rocks, (No. 393). CHARLES ISL.: covering the lower sides of projecting masses of lava, (No. 396). GARDNER ISL.: (near HOOD), *Snodgrass and Heller.* HOOD ISL.: common on the sides of cliffs, (Nos. 394-395), JAMES ISL.: *Hassler Expedition.* SEYMOUR ISL.: south side, *Snodgrass and Heller.* When found growing in rather dark protected places on the under sides of rocks, it seems to show a pseudo-heilotropism, as it grows outward toward the light.

Sticta Schreb.

S. aurata Ach.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller.* DUNCAN ISL.: common on dead bushes at 1200 ft. (No. 398). INDEFATIGABLE ISL.: southeast side, common on the bark of trees at 625 ft. (No. 399). JAMES ISL.: James Bay, abundant on the bark of trees above 1500 ft. (No. 397). NARBOROUGH ISL.: southern part, *Snodgrass and Heller.*

S. quercizans Ach.—ALBEMARLE ISL.: Iguana Cove, *Snodgrass and Heller.* CHARLES ISL.: common on the bark of trees above 1000 ft. (No. 400). INDEFATIGABLE ISL.: northwest side, common on the bark of trees above 1000 ft. (No. 401).

Teloschistes Norm.

T. flavicans (Sw.) Mull. Arg.—ALBEMARLE ISL.: *Snodgrass and Heller.* CHARLES ISL.: *Andersson, Snodgrass and Heller.* CHATHAM ISL.: *Baur.* Not obtained by the Academy's expedition.

Usnea Dill.

U. arthrocladon Fée—Narborough Isl.: southern part, *Snodgrass and Heller*. Not obtained by the Academy's expedition.

U. ceratina Ach.—Abingdon Isl.: on the branches of trees 600-1000 ft. (No. 402). Duncan Isl.: on bushes at about 1200 ft. (No. 403). Indefatigable Isl.: northwest side, on the branches of bushes and trees above 600 ft. (No. 404). James Isl.: James Bay, occasional on the branches of trees at 2000 ft. (No. 405). Narborough Isl.: *Snodgrass and Heller*.

U. dasypoga (Ach.) Nyl. var. **plicata** (Hoffm.) Hue.—Charles Isl.: *Andersson*. James Isl.: *Darwin*. Has not since been obtained by the later expeditions to these islands.

U. longissima Ach.—Abingdon Isl.: common on the branches of trees at 1000 ft. (No. 406). Albemarle Isl.: Cowly Bay, common on branches of *Bursera graveolens* above 1800 ft. The branches are often covered with long festoons of this lichen making quite a striking effect, (No. 407). Tagus Cove, common on bushes at 3000 ft. (No. 408).

Verrucaria Scop.

V. ocraceo-flava Nyl.—Barrington Isl.: common on the branches of dead bushes, (No. 411). Charles Isl.: encrusting dead branches at about 600 ft. (No. 409). Hood Isl.: common on dead branches, (No. 412). Tower Isl.: common on the branches of *Bursera graveolens*, (No. 410).

TABLE SHOWING THE DISTRIBUTION OF LICHENS ON THE GALAPAGOS ISLANDS

The sign + indicates that there is a record for the species from the island in question. The abbreviations: "Gardner Ch." and "Gardner Hd." designate respectively Gardner Island near Charles Island, and Gardner Island near Hood Island.

SPECIES	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Alectoria sarmentosa		+	+					+		+				+		+				
Arthonia gregaria										+										
" nivea	+																			
" platyspeilea												+								
" sp.	+																			
Buellia straminea			+																	
" sp.					+															
Chiodecton sanguineum		+								+				+	+					
Cladonia adspersa								+												
" ceratophylla															+					
" fimbriata			+					+												
" pycnoclada			+					+												
" sp.										+										
" sp.															+					
Coenogonium sp.															+					
Lecanora glaucovirens	+																			
" pallescens				+			+													
" punicea																			+	
Lecidea flavo-areolata	+																			
Pannaria molybdaea														+						
Parmelia camtschadalis															+					

Table Showing the Distribution of Lichens on the Galapagos Islands—*Continued*

SPECIES	Galapagos	Abingdon	Albemarle	Barrington	Bindloe	Brattle	Charles	Chatham	Culpepper	Duncan	Gardner Ch.	Gardner Hd.	Hood	Indefatigable	James	Jervis	Narborough	Seymour	Tower	Wenman
Parmelia latissima			+				+			+					+					
" perlata			+				+													
" sp.							+													
Pertusaria albinea	+																			
" leioplaca, forma bispora																			+	
Physcia leucomela															+					
" picta				+			+			+								+		
Placodium murorum																		+		
Pyrenula aurantiaca																	+		+	
Ramalina complanata			+			+	+	+				+	+						+	
" farinacea			+							+				+		+				
" indica							+													
" usneoides			+	+	+		+							+						
" sp.							+							+						
Rinodina mamillana	+																			
Roccella peruensis			+	+		+	+	+					+	+		+		+	+	
" portentosa				+			+					+	+		+			+		
Sticta aurata			+							+				+	+		+			
" quercizans			+				+							+						
Teloschistes flavicans			+				+	+												
Usnea arthrocladon																	+			
" ceratina		+								+				+	+		+			
" dasypoga							+								+					
" longissima		+	+																	
Verrucaria ocraceo-flava				+			+						+						+	

From the above it can be seen that of the 47 species, determinate and indeterminate, that have been collected on these islands, the greater number have been taken but from one or two localities. Careful collecting by one who is familiar with lichens, and thoroughly interested in the subject, would probably materially increase the number of species known from the islands, and extend the range of many of the species already known. Especially would this be the case with the smaller forms, which easily escape the notice of the ordinary collector. I make this prediction from my own experience with the vascular plants. It was my good fortune to be the only botanist who has had the privilege of collecting on these islands for any considerable length of time. Most of the former collections of plants from these islands were made by men more interested in some other line of biological work. While the collections they made were in most respects remarkably good, I found that there was a tendency to fail of getting some of the species most common on most of the islands. Possibly the great abundance of such species caused them to be overlooked. The species of *Croton,* for instance, had not been reported from Indefatigable Island until the Academy's expedition visited it; yet there is probably no place on the island where one could go for any distance from the shore without encountering thickets of *Croton* bushes of greater or less extent. Many other instances could be cited of a like nature. Of lichens, two species only (or 4.25%) are said to be endemic; which is in striking contrast with the conditions found among the vascular plants, where 40.9% of the species are endemic.

Lichens have not as yet been reported from either Culpepper or Wenman Island, the two northernmost islands of the group, or from Gardner Island near Charles Island. I remember distinctly having seen an abundance of fruticose lichens, possibly *Alectoria* or *Usnea,* covering the vegetation on the upper and inaccessible portions of Culpepper during our short stay at this island. There is no anchorage at either of these two northern islands so that the vessel had to lie "off and on" at Wenman Island while the party went ashore to collect. On this account our stay there was brief, and as I was very busy getting together during the short time at my disposal as many species as possible of vascular plants, I neglected to make any collections or observations on the lichen-flora of the island. At the time our party visited Gardner Island near Charles Island, the sea was rough, making landing dangerous. As I was unable to swim, I did not wish to run the risk of attempting to go ashore. When careful collections are made on them, all three of these small islands will probably be found to have quite a lichen-flora.

INDEX TO VOLUME I, FOURTH SERIES.

For index to "A Botanical Survey of the Galapagos Islands," (pages 7-288), see page 249.

New names in **heavy-faced type**; Synonyms in *italics*.

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